

ARCHIVES OF OTOTOLOGY.

A CASE OF INFLUENZA FOLLOWED BY MASTOID ABSCESS, SINUS THROMBOSIS, MENINGITIS, AND DEATH. AUTOPSY.

By FRANK ALLPORT, M.D., CHICAGO, ILL.

A. E., aged seventy-six. Two years ago fell through a hole in his barn loft to the floor below. Struck on his head. Received scalp wound. Soon fever and delirium followed. Recovered, but family says his mental condition was never the same again. His memory became very bad, and he appeared dazed and irrational at times. In January, 1899, contracted severe influenza, accompanied with delirium. During the attack had abscess of left ear, followed by painful and swollen mastoid for weeks. Ear was simply syringed by medical attendant. Consulted me July 13, 1899. Found some soreness of mastoid on pressure. Fistula of lower, posterior bony meatus, emitting copious, foul pus. Membrana tympani intact. Consultation with Dr. T. Melville Hardie. Operation advised and consent given. Admitted to St. Luke's Hospital, July 26th. Temperature 99.2°. Pulse 89. Feeling quite well, and good appetite.

Operation July 28th, assisted by Dr. Hardie and Dr. W. H. Allport. The second stroke of chisel found pus. Entire outer plate of mastoid removed. Mastoid cavity full of pus and granulation tissue. Cell walls completely broken down. Entire cavity thoroughly curetted. Bony covering of lateral sinus necrosed and sinus exposed, but apparently healthy. Good recovery from operation. Patient apparently making uneventful recovery. Until August 12th, nothing of any note occurred. Temperature varied from 98.4 to 99.6°. August 12th: temperature, 97.6°. Does not feel so well. Restless at night. Pain in stomach, otherwise well. Each day temperature struck 97° and a fraction. August 17th: talkative, and speech occasionally irrational. August 18th: these conditions exaggerated. Seen by Dr. Archibald Church,

who expressed favorable prognosis and advised strychnia and nitro-glycerine. August 19th: more talkative and delirious. Temperature from 97.6 to 99°. Pulse from 76 to 82. August 20th: distinctly delirious. Temperature from 98.2 to 99°. Pulse from 68 to 92. August 21st: much worse. Temperature from 99.4 to 99.6°. Pulse from 80 to 112. Seen by Drs. Church, J. E. Owen, and W. H. Allport. Dr. Hardie not in town. Diagnosis, acute meningitis. Prognosis, unhesitatingly bad. The only hope for patient is thought to be the evacuation of the cerebral abscess (should any exist). No focal symptoms. No optic neuritis. Skull trephined that afternoon, over temporo-sphenoidal lobe. Dura inflamed. Probing in various directions with grooved director disclosed nothing. Wound closed by skull button and sutures. Site of original mastoid operation found healthy. August 22d: quieter, but always delirious. Temperature from 99.6 to 102°. Pulse from 90 to 114. August 23d: same condition. Temperature from 100 to 100.8°. Pulse from 88 to 120. Same condition. Temperature from 99.6 to 101°. Pulse from 112 to 122. August 25th: same condition, only growing worse each day and passing feces and urine involuntarily. Temperature from 100.8 to 102.6°. Pulse from 118 to 136. August 26th: died 1 A.M.

Autopsy.—By Dr. D. N. Eisendrath. Present: Dr. J. E. Owen, myself, and resident hospital staff. Original mastoid operation area found healthy. At external site of trephine wound a drop or two of pus found, otherwise entire area of trephine operation, even into the brain, perfectly healthy. Dura is completely adherent to skull by old adhesions. Dura and pia deeply congested. Posterior to wound of operation pia and arachnoid show hemorrhagic suffusion. Slight puriform thrombus in left lateral sinus. Careful search made for cerebral abscess, but none found.

Remarks.—It seems strange that after apparently making a good recovery, he should suddenly develop meningitis and proceed to a rapid death. The case shows that a subnormal temperature does not always indicate a cerebral abscess, and may exist with an intense meningitis. The extremely small purulent thrombus found was not thought to have had anything to do with his death, and it surely must have developed *after* the first operation. If, however, it played a part in the fatal result, it shows that purulent thrombus

is not always accompanied by its characteristic symptoms, such as the up and down temperature and pulse, chills, etc. The query naturally arises, as to whether the old fall on his head had anything to do with the fatal result. The adhesions between the dura and skull probably indicate a pre-existing meningitis, which may have lingered, in a latent condition, only to be revived by operative procedures upon an old and debilitated patient. It is of course evident, that had it not been for the drainage from the masto-meatal fistula the case would have developed to the operating point much sooner.

MULTIPLE TUBERCULAR TUMORS OF THE
SKULL AND BOTH TYMPANIC MEM-
BRANES.

By DR. H. FREYSING, ROSTOCK.

Translated and Abridged by Dr. E. M. Cox, New York.

(From Band xxxii., S. 369, 1898, of German Edition.)

ON account of its rarity and interest the following case seems worthy of comment.

W. W., painter, aged nineteen, entered the clinic July 26, 1897. Heredity and family history very good. Patient has hitherto been well, except for measles six years ago, when he had suppuration in one ear, which one he does not know. Four months before admission, he noticed, on his right leg, a hard, rounded, painless tumor about $1\frac{1}{2}$ inches in diameter. He had stiffness of the neck, and after a time painless swellings appeared behind the right ear and on the left side of the forehead. There was some suppuration in each ear. The patient's general condition remained fairly good, and he had no fever. There was a small painless swelling near the inner canthus, and a larger fluctuating, tense, and immovable swelling between the left temple and the frontal eminence. Another tumor appeared behind the right mastoid, and reached the size of half a hen's egg. It appeared to be adherent to the sterno-mastoid muscle.

The left drum membrane was changed into a uniformly bright red, apparently granulating mass in the lower part of which there was a perforation. Malleus cannot be made out. Some odorless pus in the auditory canal. The right membrana is cloudy and dull. In its posterior third there are two circumscribed grayish-yellow swellings which run over upon the wall of the canal. Puncture of these swellings brought no blood or secretion; they were evidently solid. The hearing in the right ear was

much better than in the left. No cough or other evidences of pulmonary or cardiac disease.

July 26, 1897.—The tumor behind the mastoid was removed by Professor Körner. During its removal the growth was torn, and discharged odorless atheroma-like material, and showed an interior lined with dirty granulation tissue. Several superficial chips of bone were removed for examination. The small masses in the right membrana were then removed with forceps, and all the material was found, upon examination, to be tubercular.

Normal course. Wound behind the ear healed in fourteen days.

August 2d.—The growths on the forehead and at the root of the nose were removed. They were similar to the first mass and proved to be tubercular.

September 19th.—The wounds were finally healed. The masses in the drum membranes, parts of which only remained on the right side, were treated with 25 per cent. lactic acid and with weak chromic acid and airol. They slowly disappeared.

November 12th.—There were visible in the right membrana only two somewhat elevated scars, otherwise it was normal. The left drum membrane was much improved in appearance, looked smooth and shining, and the berry-like prominences have become smaller. Hearing on the *left*, $36 = 1.50 m$, $100 = 0.30 m$; on the *right*, $22, 36, 48$ more than $7 m$, $100 = 4 m$. The hearing is thus much improved on both sides. All the operative wounds are healed and painless, and there is no regeneration of bone where the forehead growth was removed. There was no change in the lungs and the general condition was very good; there was a gain in weight.

In January, 1898, the hearing was: *left*: $66 = 5 m$, $22 = 4 m$, $44 = 2\frac{1}{2} m$, $100 = 2 m$; *right*: $66 = 7 m$, and more, $100 = 6 m$. A careful microscopical examination of all the specimens was made by Dr. Ricker of the Pathological Institute, and all were tubercular except the bone splinter.

We have in this case an instance of multiple tubercular tumors of the skull and both drum membranes pursuing a relatively mild course.

After six months there was no recurrence, and the patient's general condition was good.

We have been, so far, familiar with tubercular nodules in the drum-membrane in the course of an acute miliary tuberculosis in children, or in cases of chronic tuberculosis in

adults, with rapid degeneration of the infiltrated regions (Schwartz). The term "tubercular tumor" is used in a clinical sense in this case. In the skin, tuberculosis sometimes appears in the form of tumors, for instance in "scrophuloderma," which behave like granulation masses, usually with a central degeneration, forming "tubercular" ulcerations. These neoplastic masses, except for their site, are exactly like the masses in the case under discussion. Scrophuloderma is rarely primary. Doutrelepont (1892) reported three cases, and pointed out some difficulties in diagnosis. In all these cases the growths were upon the face and were cured by operation. Bacilli were demonstrated in two of them. The same writer in 1894 described a six-year-old girl with twenty-nine cutaneous growths in various parts of the body. They were reddish-brown, nodulated, covered with crusts, and microscopic examination showed tuberculosis. Doutrelepont concludes that this form of tuberculosis does not have the same tendency to recur that is seen in lupus after scraping out of the ulcerations. Riehl and Wick report similar cases.

The so-called tuberculosis cutis verrucosa is to be mentioned in this connection. It is usually benign, but persistent. Knickeberg collected a number of cases, also Jadassohn and Thimm. Tuberculosis of mucous membranes occurs in various organs with lesions like those in this case. Schäffer and Chiari have collected cases of "tuberculoma" of the nasal mucous membrane. The growths were usually easily-bleeding, granulating masses, without any particular tendency to degenerate. Whether they originated in the mucous membrane or perichondrium is undecided; the latter is, however, always involved.

According to Koschier, the tubercular tumors of the nasal mucous membrane in their occurrence and histology resemble the so-called scrophulous lymphomata.

TUBERCULAR TUMORS OF THE LARYNX.

According to Avellis these growths may be described as having these characteristics:

I. Tumors which have all the characteristics of a true neoplasm, and appear as papillomatous or fibromatous

growths on the vocal cords, or as solitary masses covered with mucous membrane.

II. The tumors are often seen in cases without pulmonary disease, and may, therefore, be primary in many instances.

III. The most frequent sites are in the sinuses of Morgagni, and on the true or false vocal cords.

IV. They rarely ulcerate, and their contents show giant cells and tubercle bacilli.

V. Their course is chronic.

VI. They occur in early life.

VII. Operative removal is always beneficial and sometimes curative.

Jores describes a case in which laryngectomy was done for supposed carcinoma. Although the glands were diseased, there was no serious involvement, and the writer called the case one of "tubercular infiltration of the laryngeal mucous membrane."

Kramer and Hartmann describe similar growths in the rectal mucous membrane, and Hattute mentions a case with stricture of the pylorus.

Fränkel and Franqué give cases of much the same sort of growth in the uterine mucous membrane.

Askanazy, Neelsen, and Goldschmidt mention the disease in the pleura.

Israel describes similar lesions in the peritoneum.

Several authors describe tubercular tumor in muscles. They are usually benign, and sometimes resemble lipomata. This form of disease is exceedingly rare in the kidney as a primary growth.

The central nervous system is rarely affected; when it is, children are usually the patients. Bach (Würzburg) describes a case of granulation-tumor of the iris. Haug describes cases in the external ear.

We may consider that this form of tubercular tumor occurs in two forms. The first is of a somewhat soft granulation-like consistence, the second is denser, and may be of cartilaginous hardness. We find the growths in almost every organ. They are benign, and do harm only mechanically.

OTITIS MEDIA IN EARLY CHILDHOOD.

BY PROF. A. BARTH, LEIPZIG.

Abridged Translation (from Band^xxxxii., S. 111, 1898, of German Edition) by
Dr. ADOLPH O. PFINGST, Louisville, Ky.

THIS subject was suggested to me on account of its importance and because of the obscurity which still exists in this field of work. Its importance becomes apparent when the frequency of middle ear involvement in children ill with other affections is considered. Of 600 sick infants examined before and after death, 80 per cent. were found to have a lesion of the middle ear.

My study of the subject, limited to children in the first three years of life, included 48 patients seen in 1896 and 78 seen in 1897. All but 7 of the 48 showed evidence of inflammation of the middle ear of greater or less degree. In 5 of the cases the ear was normal and in 2 the external auditory canal was inflamed. Of the infants seen in 1897, 19 were in their first year, 29 in the second, and 30 in the third. In all but 3 there was a discharge of pus from the ear. In the remaining 3 the middle ear was inflamed but the drum was intact. In 9 of these cases the mastoid cells had to be opened. Although without complete record of the cases occurring in 1896, the operation was, as far as I remember, performed three times in that year. A noteworthy feature of the cases recorded in 1897 is the frequency with which spontaneous perforation of the drum had occurred. Autopsies have shown that the drum usually remains intact in most of the cases of inflamed middle ear.

In the examination of children I have them, by preference, in the erect posture, held in proper position upon the lap of an assistant. Occasionally the examination was made in bed in the recumbent position. Where it was possible, reflected rays from a Welsbach light were employed, otherwise from a lamp. Difficulty was sometimes experienced in seeing the drum on account of a narrowing of the auditory canal or on account of the presence of lanugo which necessitated the use of a narrow speculum. For the removal of cerumen or epithelial scales I prefer the syringe to the use of forceps and cotton probes. An astounding observation in the examination of these infants was their thoroughly good behavior. It has been my experience that they cry when they are placed in position and held, but as soon as manipulation of the ear is begun they almost invariably quiet down at once—unless, of course, the manipulation is painful. Upon releasing them, they again begin to cry.

It seems that in early childhood the more remote parts of the ear are not involved during acute middle-ear inflammation as they are in adult life. In fact, I would hesitate to open the mastoid cells in a child if the only symptoms of mastoid inflammation were a swelling and redness of the upper and posterior portion of the auditory canal. While some authors claim that it is frequently impossible to see the drum-membrane of a child, this has not been my experience. The upper portion is often horizontal in children and apparently continuous with the upper wall of the ear canal, but some portion of the drum can always be brought to view, unless unusual abnormalities exist. Some part of the upper segment can also be seen, as a rule, notably the short process of the malleus. Though the middle ear may be inflamed and contain pus, the drum often shows little or no alteration outside of a bulging at some part. The drum may or may not be injected. Sometimes the fluid in the tympanum can be seen through the drum; again the drum may become infiltrated with the fluid and take on a turbid appearance. In rare instances a perforation may not be detected, as it is possible for a small hole in the drum to be obscured by the infiltration of the membrane and

desquamation of its epithelium. In these cases the diagnosis will have to rest upon the presence of a pulsating reflex on the fluid in the bottom of the external ear canal and upon the character of the discharge. Even these common signs may not be present, in which case an immediate diagnosis is not possible.

However, if there are symptoms of inflammation of the external auditory canal, the possibility of a middle-ear affection should not be overlooked, as it is well known that the pus of a neglected case of otorrhœa is a frequent cause of inflammation in the ear canal. In such cases careful watching and cleansing of the canal will clear up the diagnosis in a few days.

In young children with otorrhœa, without apparent complications, I have, under rational treatment, nearly always brought about a rapid cure, and I cannot recall a single instance in which severe complications followed acute otitis media. This may, in a measure, be due to the personal attention that I give the cases. I have them, as I also do all simple cases of otorrhœa, report to me every day for irrigation, which gives me the opportunity to insure proper cleanliness, and at the same time see complications soon after arising, and to institute proper treatment. The large number of complications of middle-ear abscess which we encounter are, to my mind, due very largely to neglect. We will continue to see them with the same frequency as long as physicians are so prone to look upon these cases as trivial affections. In a general way it may be said that it is nearly always possible to expose the drum-membrane to view, and recognize its normal condition, and mostly to detect the existence of inflammation of the middle ear, but that it is not easy to foresee the outcome of a diseased middle ear, and its subsequent effect upon the general condition of the child.

It would not be amiss in a treatise on middle-ear troubles to review the sources of the infection in these cases. Although it is universally believed that infection may take place through the circulatory system, there is no doubt that in by far the greatest number of instances the infecting

elements pass into the tympanum through the Eustachian tube. They reach the tympanum either by an extension of a specific inflammation along the mucous membrane as in diphtheria, scarlet fever, etc., which usually results in an acute process, or through foreign substances which find their way into the tympanum by way of the Eustachian tube, notably through water forced into the tympanum during bathing, or with a nasal douche. Lately the belief that the infecting elements reach the tympanum through the blood has grown because of the infrequent presence in the middle ear of the germ specific of the primary inflammatory trouble in the naso-pharynx, *e. g.*, the diphtheria bacillus in diphtheria. More frequently the pus of the middle ear contains pneumococci, pneumobacilli, or streptococci. However, if we stop to consider that in acute inflammation of the naso-pharynx the ear complication does not develop, as a rule, until the primary inflammation has almost or entirely subsided, the theory of infection through the circulation does not hold. Infection by this channel would set up inflammation simultaneously with, or soon after, the inflammation of the site of infection. I have pictured the process about as follows: the inflammation extending from the naso-pharynx swells the mucous membrane of the tube, thereby closing its lumen. Germs harbored in the tube or the naso-pharynx near the tube at the time (we know that these parts always carry many varieties of pathogenic germs) find their way into the tympanum, while the bacteria specific of the inflammation in the naso-pharynx which reach the opening of the tube after it is swollen are excluded. By the closure of the tube its normal function as a passage for air is interfered with. The growth of the germs in the tympanum and the consequent inflammatory action are thereby favored. The frequency with which middle-ear affections occur in children would lead to the inference that anatomical conditions are such in children as to favor the entrance of germs into the tympanum, and that the mucous membrane of the middle ear is peculiarly favorable to their growth.

The symptoms also differ materially in childhood from those of adult life. In the adult the drum bulges some, is

red and swollen, and the ear canal and the soft parts over the mastoid are usually swollen. In early childhood the bulging of the drum is usually marked, but as a rule there is no thickening or redness, while the surrounding parts are usually not implicated. Spontaneous rupture of the drum is the rule in adults, while in children it is the exception, the short wide tube at this age allowing the exudation to discharge into the naso-pharynx. But even in children the lumen of the tube is sometimes entirely closed by the swollen mucous membrane. Besides the anatomical conditions there are certain physiological factors which have a modifying influence upon middle-ear inflammations in children. The power of resistance of the mucous membrane is reduced, along with a general reduction of the vital forces during illness of the child, and consequently reacts less violently than it would under ordinary conditions when infectious elements come in contact with it.

It is not uncommon for the pus in the middle ear to be thick and tenacious so that drainage through the tube is not possible. It may even remain clogged in the middle ear after the drum has been perforated, allowing a rapid closure of the opening. Post-mortem examinations of such cases have shown pus so tenacious that it was not dislodged by holding it under the running hydrant. Having lately found pus of this character in an adult, who for some days had been in a moribund condition, the possibility has suggested itself that a weakened heart action has much to do with the thick tenacious character of the pus.

In the treatment of children with otitis media we must adhere in a general way to the principles governing the treatment of the disease in adults. Internal medication should naturally be modified according to the age. The local use of heat and cold, although more troublesome to apply in children, acts as beneficially as in later life. In my hands the local use of iodine has been particularly well borne by children, and has been of benefit in the treatment. As in the adult, close attention should be given to the nasal passages during middle-ear inflammations, and obstructions to the free access of air removed if possible. An exploratory

incision into the drum, when in doubt whether the tympanum contains pus, has been practised but is hardly justifiable. However, at the first symptom of the retention of pus paracentesis should be resorted to. When pus is discharging through an opening in the drum, the result of paracentesis or of spontaneous rupture, the opening should be kept from closing as long as acute symptoms are present. The tendency is for them to close rapidly. I have for years, instead of enlarging the opening with a knife, in such cases made use of a caustic,—especially in small children. After cocainizing the edges of the perforation with a 10–20% solution of cocaine and subsequently drying the parts with a cotton probe I place a crystal of chromic acid directly into the opening. The crystal slowly dissolves and diffuses over the mucous membrane. When it has acted sufficiently long the superfluous acid is removed with a cotton probe. The application is perfectly painless and leaves a round, smooth opening which allows thick secretion to escape more readily than an incision and which heals slower than the latter. I have never seen a case in which it failed to close after the flow of pus ceased. However, on several occasions I have observed an unfavorable action on the pus in the tympanum follow the use of chromic acid, by causing a coagulation of the pus and a plugging up of the opening in the membrana tympani. About eight hours later symptoms of retention, such as pain, a sense of fulness, and a thumping noise in the ear, appeared. In every case the plug soon softened and passed and I have yet to see a case where the use of chromic acid has done permanent damage. Consequently I give it the preference over the other methods of preventing closure of the perforation in the drum. In cases of persistent otorrhœa the syringe will have to be resorted to. In view of the fact that the danger of mastoid complication is not great in children and that the anatomical relations are such as to allow discharge of pus through the Eustachian tube, I believe that we are justified in using air pressure through the external ear to force the pus into the naso-pharynx, especially when the pus is tenacious. This treatment should be instituted immediately after paracentesis of the drum.

Inflation from the naso-pharynx may also be practised. The use of gauze tampons in the ear canal, which of late has found some favor in the treatment of otorrhœa, is not, in my judgment, good treatment. I can see no indication for them for they in no way further drainage but, on the contrary, act as a plug and consequently retard the flow of pus. In children I leave the ear canal open, while adults are permitted to wear cotton in the ear, which is to be changed frequently.

The influence exerted upon the general system in cases of otitis media is greater in children than in the grown. They often lose their appetite and have other digestive disturbances which, if the trouble lasts long enough, end in general marasmus and death. Symptoms of some other trouble to which the ear affection may be secondary often mask the symptoms of the middle-ear inflammation entirely; again the middle-ear trouble may run its course without affecting the general condition of the child.

The extent to which the ultimate function of the ear suffers in middle-ear affections differs, but in no case is it possible to foresee the amount of disturbance done to the hearing. Unfortunately I have no record of the temperature in the acute cases, as the children were all treated in the out-door department, where the temperature could not be watched. In the chronic forms the temperature runs very much as it does in the adult—*i. e.*, there is a very slight but irregular elevation of temperature, with an occasional sudden rise and fall. A more pronounced rise or a persistent high range for several days would indicate some serious complication or a new infection. Irregular temperature, with daily elevation of one or two degrees, would look suspicious of tuberculosis.

From what has been said of the frequency of middle-ear inflammations in children and of the absence of symptoms in many instances, we can conceive of the rationale of a daily examination of the ears of all unwell infants, from the beginning of their trouble to the end of convalescence. In the absence of otorrhœa, there is no symptom by which inflammation of the middle ear can be recognized with any degree of certainty, so that the children are often treated

for other infantile diseases when an inspection of the drum might have led to a diagnosis.

Mastoid involvement does not in children necessarily indicate an operation, as the inflammation may subside spontaneously. As evidence of such occurrence I will briefly cite two instructive cases from my practice.

CASE 1.—A child, one year old, had otorrhœa of several weeks' standing, which had started with acute symptoms. From a small perforation in the upper and posterior segment of the drum there was a scanty discharge of a tenacious pus. The perforation showed a marked tendency to close, the surrounding membrane becoming injected and raised as it got smaller. Simultaneously with this narrowing of the perforation in the drum, the soft parts over the mastoid became swollen. Four times this occurred, and subsided immediately upon enlarging the opening in the drum, until it finally, after 2-3 months, closed permanently.

CASE 2.—In a child, fifteen months old, a decided swelling was noted over the mastoid and extending slightly down the neck, after an otorrhœa of several days' duration. The drum was apparently normal and, outside of a rise in temperature (102.2° F.), the general condition of the child was not affected. By the local use of iodine on the mastoid and the application of cold, the swelling subsided and in ten days the part was restored to normal.

In the acute forms of middle-ear disease the mastoid is not often involved sufficiently to cause objective symptoms. The tympanum and mastoid cells are at this period not so well defined as in the adult, and can be looked upon as one large cavity. The trabeculi of bone at this age are in a state of immaturity, and show a tendency to break down in disease of the parts and form one cavity, which fills with pus and granulation tissue. Even where such a cavity has formed and filled with products of inflammation, and notwithstanding a thin cortex of bone, it is often impossible to notice changes over the mastoid. Where such extensive changes have taken place in children, involvement of the facial nerve is particularly common.

The bottom of the external ear canal is nearly always narrowed in children with extensive changes in the middle ear and mastoid, and rarely granulation tissue extends into

it from one of its walls, under which loose pieces of necrosed bone can be felt with the probe. If the mastoid contains much pus it sometimes burrows down the neck.

In the operative treatment of mastoid affections we have to differentiate between two kinds of cases, viz.: those in which the cortex of the mastoid has been broken through, and pus is found under the soft parts, or, possibly, discharges through a spontaneous perforation; and those in which the pus remains limited to the bone. Pus invades the soft parts usually at a point where the infantile mastoid is situated. This is deep, and apparently in the upper part of the neck. It can in fact be compared to an abscess of the neck in adults.

The pus, on the other hand, may leave the mastoid higher up behind the auricle. These are the more common cases, and the pus may burrow up under the soft parts, or the perforation may be situated higher up at the upper edge of the temporal bone, and even destroy a portion of the squama.

The operation for relieving mastoid disease is simplified, where a fistulous opening exists by following on a grooved director to the diseased area. As ossification is incomplete in infants, it is sometimes difficult, in making the mastoid incision, to tell when the knife has entered the mastoid, or how deep it has penetrated. This endangers the deeper and vital parts, especially if surrounded by septic material. I recall a case in which I cut through the comparatively soft mastoid into the dura, with the result that septic meningitis set in, resulting fatally. In the adult there is less danger of such accidents.

The periosteum covering the mastoid is not as readily detached in infants as it is in adult life. It is firmly attached to the bone by connective tissue, so that it is almost impossible to remove it without the aid of some cutting instrument. In infants the attachment of the sterno-cleido-mastoid muscle also spreads over the entire mastoid.

After entering the bone the relation of the parts can best be studied by the aid of a probe introduced in the ear canal. It will be found that the floor of the pus cavity is frequently formed by the bony ear canal; where there is a fistulous

opening in the mastoid, the bridge of bone between it and the ear canal should be removed in order to leave a free opening into the middle ear. If it is not even possible to grasp the bone at this point, the cartilaginous ear canal will, as in cases without a fistula, have to serve as a guide to the opening. After reaching the tympanum, the cartilaginous wall is pushed aside, which exposes the drum and enables the operator to preserve that membrane if in a healthy condition. In removing the cortex of the mastoid and the bony covering of the tympanum, it is best to work back from the posterior edge of the porus acusticus externus. In the selection of the instrument for entering the mastoid in young children, I have given Hartmann's concha-tome the preference. The tissue is at that time too fibrous for the chisel or curette to take hold, while with the concha-tome the cartilage can easily be entered.

With it I remove all the cartilage which forms the outer wall of the cavities in the mastoid, taking the precaution to cut the tissue in a direction as near parallel with the surface as possible to avoid injuring the deeper parts. The danger of wounding the lateral sinus is greater at this age than in later life, owing to the uncertainty as to its location. I am on this account extremely cautious in removing granulation tissue with a curette in children. Fortunately it is not as essential to cleanse the cavities of this tissue as thoroughly as in the adult, as it more readily exfoliates if there is free drainage. After cleansing the cavity as thoroughly as it is deemed advisable, it is covered by the soft parts. The posterior wall of the membranous ear canal is split horizontally to the concha. It is then pressed into the cavity of the mastoid and held in place by means of a tampon. The wound behind the auricle is closed if in a healthy condition.

By these more thorough operative measures than have been customary with most operators, we are able to bring about a more rapid cure of severe cases of otorrhœa and to preserve more of the function of the ear. Undoubtedly lives are also saved that with other treatment would have been lost.

A CASE OF EPIDEMIC CEREBRO-SPINAL MENINGITIS WITH BILATERAL OTITIS; TREPANING OF BOTH MASTOIDS, AND EXPOSURE OF THE TRANSVERSE SINUS; RECOVERY.

BY DR. STANISLAUS V. STEIN, MOSCOW.

Translated and Abridged from Band xxxii., S. 258, 1898, by Dr. J. A. SPALDING, Portland, Me.

Kolla, C., æt. five years and eleven months, had whooping-cough beginning in November, 1894, and lasting till March 17, 1895, when the first symptoms of a new disease began with epistaxis and fever. Between that date and the 29th of March he had a temperature varying from 101° to 102.5° , pulse from 110 to 130, delirium, bronchitis, otorrhœa on the right and then on the left side, constipation, loss of hearing, enlargement of the spleen, enlarged pupils, convulsions of the upper and lower extremities, general hyperæsthesia, and incontinence of urine. The otorrhœa stopped for a while in one ear and then returned so that finally, on April 3d, I was consulted to see if there were any connections between the ears and the other symptoms.

I found double otorrhœa, discharge moderate but thick, perforations in lower anterior quadrants of both *Mt*, and slight nasal catarrh. The diagnosis was rendered difficult by the rigidity of the neck. Temperature fell as low as 99.8° . The ophthalmoscope revealed anæmia of the fundus of both eyes, œdema of optic papilla, but no choked disc nor choroidal tubercles. As the temperature had fallen to 99.4° , considering the loss of strength, the possibility of a collection of exudate in the calvarium, and the peculiarity of the symptoms, it was decided to open the mastoids.

The right mastoid was found to contain much stringy mucus and pus, whereupon I opened down on to the transverse sinus with

the result of letting off more stringy exudate. A syringe passed into the sinus failed to find pus or thrombus, whereupon the field of operation was closed.

The left mastoid, antrum, and sinus, were similarly operated, directly after the right, and found in about the same state.

April 7th.—Temp. 100.8° in the morning, and 101° at night. The child tries to reach for the bandages constantly, groans during the change of dressing, closes the eyes better, but the spasm in the neck and condition of the sensorium are as before.

Between the last date and April 11th, the child improved, the tossing of the head was less, the pupils reacted to light and shade, the lips made swallowing movements, but the total loss of consciousness and spasm of the neck muscles still persisted. Incontinence of urine, no vomiting, but the constant attempts to pull away the bandage compelled us to tie the child's arms.

Up to April 19th, there was not much change except slight perspiration at times, epistaxis once, more consciousness, in that the left arm reaches for the left ear and the right arm for the right ear during the change of dressings. Syringing of the aperture evacuated some pus. Temp. 99.4° . On giving him some bitter powder he spits it out, a sign that the sense of taste is returning.

April 23d.—He moves his eyes and fixes objects.

April 27th.—He hears loud tones, holds out his hands, points with his fingers, recognizes his mother for the first time, but cannot repeat any words spoken to him.

By the 2d of May, he could remember things occurring before his illness, but had a bad night with some delirium which, however, lasted but briefly, so that on the next day he was much better again and continued to improve.

From this time on the child's condition constantly improved, the wounds in the mastoid healed completely, the hearing increased to 12 *m* for whisper, and the perception for tones throughout the entire scale seemed normal.

Microscopic examination of the discharge at various dates revealed the diplococcus intracellularis Weichselbaumi.

The probability of this being a case of epidemic cerebro-spinal meningitis is enhanced by the fact that this child's brother, four years old, was attacked with typical symptoms of meningitis on the 16th of April, and died on the 21st. The ears of the latter patient seemed healthy. The

temperature varied from 99.4° to 103°. The parents regretted that this child could not also have been operated upon. Possibly in the future the mortality of such cases, which yield to no other treatment, may be materially reduced by early opening of the cerebral cavity. Perhaps, additionally, bilateral opening of the mastoids in typical cerebrospinal meningitis will act as thoroughly as opening of the abdominal cavity in tuberculosis.

The case here offered is interesting to the neuro-pathologist in the gradual restoration of the function of the various portions of the brain. First we observe return of the sensation of pain, then of the motility of the upper and lower extremities, then of the movements of the lips (as in sucking), mimic motions of the facial muscles and of the eyes, and finally of the taste, hearing, comprehension of words without the capacity to repeat them, and last of all disappearance of the rigidity of the neck.

ON THE THYROID TREATMENT OF CHRONIC DEAFNESS.

BY DR. ALFRED BRUCK, BERLIN.

Translated and Abridged from Band xxxii., S. 72, 1898, by Dr. J. A.
SPALDING, Portland, Me.

MANY attempts have been made to extend the thyroid treatment of other diseases to certain forms of deafness included under the vague term of dry chronic middle-ear catarrh, or the still more vague one of middle-ear sclerosis.

Scarcely any other disease of mankind has remained so obscure as the so-called sclerosis of the middle ear, and although the pathogeny of some types has been somewhat elucidated (anchylosis of the plate of the stapes: Politzer), yet we have mostly gone no farther than mere hypotheses.

Nor have we been more successful so far as the treatment is concerned, for in lack of a cure there has always been a constant search for new methods and new remedies, so much so that we must still feel skeptical of doing the patient any good, nor can we congratulate ourselves on having found a final cure.

Most of the usual tests for hearing are still imperfect. Vulpius,¹ for instance, says that none are of unconditional value for diagnosis (I would like to add for prognosis also) of the various types of ear disease beginning with progressive loss of hearing. Especially unfavorable is the outlook in the adhesive or sclerotic processes.

¹ Vulpius, "Ueber Behandlungsmethoden bei adhäsiven Mittelohrprocessen," *A. f. Ohrenhkd.*, Band xlv., Heft 1, 1896.

Vulpus has lately recommended the thyroid treatment in adhesive affections of the middle ear. He expresses himself hopefully, and looks for favorable results in the treatment of cases which hitherto have been thankless. He was led to employ this method because he had read in the clinical reports of deaf myxœdematous patients treated with thyroids, that the hearing had improved during the constitutional treatment and without any local application. Ewald¹ thinks that about one half of his cases of myxœdema are deaf from "chronic catarrh of the membrana tympani," whilst Vulpus attributes the deafness to chronic hyperplastic catarrh of the middle ear.

Basing his theory on these cases reported by Ewald, Vulpus employed thyroids in every case of deafness and obtained, especially in younger people, surprising and promising results in those cases characterized with opacity, thickening, rigidity, or induration of the *Mt*, and diminished mobility of the ossicles. He claims to have obtained in cases that had resisted every other means of treatment astonishing improvement of the hearing. The thyroid treatment was repeated from time to time to preserve the hearing. He gave one dose daily of 0.30 gram of Merck's or Leichtenstern's tablets, to children half that dose, and carried it on for four weeks with occasional rest for a day or two. If no improvement ensued in ten days he suspended the tablets entirely.

Vulpus refers the benefit to rapid and energetic resorption of œdematous fatty tissues, and says: "Since the hyperplasia of connective tissue with consecutive shrivelling and eventual calcification or ossification is in most cases of adhesive middle-ear disease introduced with the formation of easily absorbable proliferation tissue, we may take it for granted that in the latter the effect of the thyroids begins." Such a view would also explain why in the initial stages the remedy acts to the greatest advantage, and, conversely, why it is less efficacious the more the neoplastic tissue has consolidated and become less amenable to absorption.

¹ Ewald, *Die Erkrankungen der Schilddruese, Myxoedem*, etc., Wien, 1896, p. 157.

I need not go farther into theories, but will suggest that the diagnosis of such thickening and adhesion is difficult, and that consequently the proper indications for the thyroid treatment are difficult to establish.

Incited by Vulpus's paper, further investigations were begun at Politzer's clinique by Brühl, and at Gruber's by Alt. Brühl treated 21 very deaf patients, aged between twenty and forty, with the thyroid tablets and nothing else. He¹ found, out of 16 who were treated a long time, 8 with not the slightest improvement in hearing, 2 left improved before the permanency was assured, 4 showed a satisfactory improvement after several weeks, and 2 were greatly improved, 1 showing an increase for the voice from $\frac{1}{2}$ M to 7 M. Brühl gave one tablet of 0.30 gram daily for a week, and in the second week two or even three daily. After four weeks he stopped, and in three days began again as at first. Neither he nor Vulpus observed thyroidismus. Brühl's views are not so highly colored as those of Vulpus. He attributes the benefit to the iodine in the thyroids or to some functional connection of the thyroid gland with the ears, and he urges the new method in those cases in which we are well assured that the alterations are susceptible of absorption.

Alt² obtained very good results in patients for whom all other methods had been of no avail. He thinks well of the thyroids, and recommends them also in the residua of chronic suppuration, with cicatricial alterations in the mucosa of the tympanum, rigidity of the ossicles, fixation of the stapes plate, and obliteration of the round window.

Politzer thinks that we should not be too sanguine about the thyroid treatment, but postpone a definite judgment until time has shown its real value.

Although one has a right to be distrustful of any help to be obtained by new methods in chronic deafness, yet the few favorable results so far published led me to try it with much perseverance, for I can now refer to forty patients with

¹ Brühl, "Ueber Thyroidbehandlung bei adhäsiven Mittelohrprocessen," *Monatsschr. f. Ohrenhkk.*, 1897, No. 1.

² Alt, *Monatssch. f. Ohrenhkkde.*, 1896, Band xii.

whom I have followed Vulpius's suggestions with but few modifications. The number would have been larger had I not selected my cases carefully, all between eighteen and forty-eight years, and all of whom had been treated by well-known methods,—pressure-probe, injections of chloral hydrate, and sodium bicarbonate into the middle ear, to say nothing of air-bag and catheter,—but all in vain. Then the thyroid tablets of Wellcome and Burroughs, as well as those of Merck, were used. In two cases both kinds were employed, one after the other. The dose was at first 0.10 gram, three times daily, occasionally two tablets each of 0.10, twice daily. One patient took three tablets of 0.10 in one day, but soon exhibited well-known symptoms of thyroidism, with palpitation of heart, sense of fear, faintness, and lassitude. In two other patients one dose of 0.30 produced the same manifestations. Finally, in one patient, a nervous, sensitive, and corpulent woman, thyroidism was so marked that nothing could be done after one or two doses.

These instances prove that the treatment is not so free from danger as Vulpius would have us believe, although even in face of the occasional thyroidism, one might reasonably persist with it, were any reasonable degree of success to be expected. But such in my opinion is not to be expected, contrary as it may be to that expressed by others, and so little encouraging as to prevent others from proceeding with their experiments. Personally I must say that from the employment of thyroids, no matter for how long a time, I have not yet seen a single case of positive improvement in the hearing.

Among my cases were some of adhesive processes, some with slight ankylosis of the ossicles, and some with the residua of middle-ear suppuration. I believe the slight improvement in hearing occasionally noted depends on erroneous observations. Slight variations in hearing, unless permanent, prove nothing at all. They may depend on changes in the atmosphere, on the intensity of the subjective sensations of sound, and on the attention and intelligence of the patient. It is suggestive in this respect that the slight improvement noted was observed only in the

intelligent, the better mental development leading probably to self-deception. Thus, in testing with the voice, we habitually use certain numbers and words, for the sake of simplicity, and this very simplicity leads to guesswork, and so the patients think that they hear better than before. But if then we use words that they have not heard before, the improvement is shown to be due to self-deception.

Errors of this sort may be avoided by following Jacobson's suggestion, and using two numbers or words directly after the other as 32 or 68, or Friedrich and Bismarck. Then we note the distance at which the first word was correctly repeated by the patient. Now if at a later test the same word is heard farther than before, we put that distance aside, and test with the second word, when if the distance is equal to what it was at first for the first word we grant as good hearing as before and test again for some improvement. When the percentage of gain is great, all doubt is excluded as a matter of course, although repeated tests may be undertaken for verification. When the increase is slight it is more likely to be due to sources of error. For all these reasons we should often test with the watch, in addition to the voice, and with Politzer's audiometer, or, better still, with a stop-watch, so as to test when the watch stops or goes ahead.

After this digression let me return to my theme, and say again that, in spite of the fact that all possible sources of error were excluded, I failed to obtain any results which could influence my unfavorable opinion regarding the thyroid treatment in chronic deafness. My material may not have been large enough, and there may have been too many patients with alterations beyond absorption. But it is, after all, curious enough that, in a list of cases larger than those of Brühl or Alt, I failed to find even one instance of well-marked improvement in hearing. Therefore, I close by saying *that, according to my experience, the treatment by thyroid extract of chronic deafness, no matter how it originated, is useless in every case in which all other methods have equally failed.*

SUPPLEMENT.—After finishing a proof-correction of my

former paper, I saw one by Eitelberg,¹ reporting his results by this method. In 8 cases observed for a sufficient length of time, he saw improvement in 3, one of these being a man over fifty, though not until some time after treatment had ceased. The tinnitus in these three cases was also improved. Eitelberg does not expect a great deal from the new method, but urges further investigations. It should be noticed that Eitelberg kept on with the old methods (catheter, etc.) whilst employing the thyroids. I think that in order to obtain an impartial opinion of the value of the new method it must be employed alone. But, as some cases of *later improvement* have been here shown, I intend, for the lack of anything better, to go farther along with my thyroid investigations, though I must confess not with great hope.

NOTE BY TRANSLATOR.—From my small experience with the thyroid treatment, I should be inclined to recommend it in the *early stages* of those cases which are likely to eventuate in the so-called chronic catarrh of the middle ear. Especially have I found it of some value in cases with one ear affected considerably and the other but little. It seems to act as a preventive. I may add *passim* that the *supra-renal extract*, so much extolled as a local astringent for nose, ear, throat, and eye diseases, is improving some cases of tinnitus at present under my care.

¹ "Zur Behandlung der Mittelohrsclerose mit Thyroidintabletten," *Arch. f. Ohrenhklde.*, 1897, Band xlvii., Heft 1.

TINNITUS AURIUM.

BY DR. RUDOLF PANSE, DRESDEN.

Abridged Translation by Dr. JULIUS WOLFF, New York.

(From vol. xxxiii., *Germ. Ed.*, p. 244, 1896.)

THE following reflections upon tinnitus aurium are intended to serve as a supplement to my publication concerning *Hardness of Hearing Caused by Rigidity of the Tympanic Fenestræ*,¹ and also as a basis for further investigations of the subject.

I have examined the cases that have come under my observation in a uniform way and have extensively searched the literature on the subject.

NOISES IN THE EARS OF HEALTHY PERSONS.

Hensen in his treatise upon the *Physiology of Hearing* distinguishes two groups of noises:

1. Low, dull ones, which preferably arise in the middle ear, like the resonance sound C (according to Helmholtz) of the ear drum after closure of the ear, or the muscle sound of yawning, or the vascular sounds heard during absolute quiet.

2. High, ringing ones, which arise from conduction into the labyrinth through the stapes, the fenestra rotunda, or the labyrinth watch.

Preyer and Brunner say: (1) the muscle sound does not go above $A^{II} = 27$ vibrations; (2) it is fluttering and less uniform than the one arising from the blood-current.

¹ Gustav Fischer, Jena.

According to Schwartz the noise caused by pressing the jaws together must be interpreted as a muscle sound.

Lucae noticed after arduous work, especially at night, that he heard a high, faint ringing (f'') on the left side, and attributes it to the positive labyrinth pressure.

In agreement with Lucae, Schwartz writes: Noises in the ears of healthy persons may follow disturbances in circulation, violent emotions, mental over exertion, and long continued, monotonous impressions of sound. Furthermore, continuous noises may occur during a lifetime in persons of normal hearing, due probably to anomalies in the course of vessels.

Hyrzl describes rare cases in which the stylo-mastoid artery runs between the branches of the stapes, whereby noises can also be caused.

I myself have on two occasions been able to test with tuning-forks ringing noises in my ears, arising without provocation, and found once c' , once g' .

According to Gottstein, Lucae was the first to emphasize the fact that during strong contraction of any group of facial muscles, especially of the orbicularis palpebrarum, the stapedius may also be stimulated to contraction, which is manifested, subjectively by a sensation of hearing, objectively by an outward movement of the ear drum.

Hitzig, and after him Bernhard and Berger, found that in cases of facial paralysis the attempt to contract the completely paralyzed muscles causes a low buzzing in the ear through the contraction of the stapedius. Samuel Sexton mentions, besides the well-known causes, friction of the joint-surfaces of the ossicles.

Kiesselbach states that entotic ringing occurs in a normal ear from galvanic stimulation of the auditory nerve; also at the end of the act of yawning in normal ears as well as those affected with catarrhal deafness. The latter he considers to be a result of an irritation of the end apparatus of the auditory nerve by a contraction of the tensor tympani. Kiesselbach thinks that the sound accompanying ringing in the ears or irritation with the galvanic current originates from the sounds of the blood-current, which normally we do

not hear, as we have become accustomed to the constant stimulus. They reach our consciousness, however, as soon as the objective noise becomes stronger or changed in some way, or when the irritability of the auditory nerve is increased. The sounds themselves come from the resonance spaces of the middle ear.

Even if there is a considerable discrepancy in the opinions of other authors concerning the mode of origin, the well-established facts seem to be in harmony with Hensen's conception, "Low notes are produced in the middle ear, high ones principally in the inner ear."

PATHOLOGICAL NOISES IN THE EARS, IN GENERAL AND CLASSIFIED.

The earlier writers distinguish among the noises in the ears, *susurrus*, *sibilus*, *bombus*, *tinnitus*.

Itard distinguishes between true and false noises in the ears. The former arise from actually existing sounds; the latter follow explosions or long-continued noises, or accompany hypochondriasis, hysteria, cachexia, wakefulness at night, etc., and may lead to hallucinations. Itard believes that with compression of both carotids the buzzing generally ceases. As an historical example he states, J. J. Rousseau for thirty years had arterial hammering in his ears.

v. Gaal believes that venous noises are buzzing in quality, those of arterial congestion more ringing.

Wilde compares *tinnitus* with the *mouches volantes* in the eyes. As one of the causes of the noises he designates the "non-vibratility" of the ear drum.

Kramer assumes the seat of noises without hardness of hearing to be in the *chorda tympani*, and treats them with strychnine per tubam.

Politzer describes noises due to (1) plugs of cerumen or abnormal pressure upon the ear drum or its adnexa; (2) furuncles occluding the meatus, coincident hyperæmia in the tympanum and labyrinth, reflex irritation of the auditory nerve; (3) eczema, and also swelling of the mucous membrane of the tube and tympanum.

According to Politzer, noises are present in more than two thirds of all cases of disease of the middle ear, much more rarely, however, in purulent catarrh with perforation than in simple catarrh without perforation. The causes are: increased intra-auricular pressure, hyperæmia of the mucous membrane and secondary changes in the labyrinth, permanent hyperæmia, widening of blood-vessels, chronic exudation, formation of calcareous salts and pigment.

Politzer mentions as causes for noises in the labyrinth: hemorrhages, contusion of the nerve-endings, calcareous deposits, varicose dilatation of the vessels in the nerve trunk, colloid degeneration of the auditory nerve, new growths in the cochlea and auditory nerve.

Tröltsch distinguishes between two kinds of subjective auditory sensations:

(1) those due to irritative conditions of the auditory nerve in chronic, especially mechanical, hyperæmia of the contents of the skull, in intoxications, quinine, salicylates, alcohol, in anæmia, chlorosis, valvular lesions, nervousness.

(2) real ones, arising in the head, usually of vascular origin, constant in acute inflammations of the tympanic membrane and cavity and increased pressure in labyrinth. He emphasizes that "All noises actually arising in or near the ear must necessarily act more strongly on the auditory nerve, if the natural outward sound conduction from the organ of hearing is in any way diminished."

Buzzing in the ears without impairment of hearing, "which may occur with any severe cold in the head," is attributed by Tröltsch to hyperæmia of the tubes.

The blood-vessel sounds arise (according to Nolet-Leyden) from eddies in the current, especially at points where the blood flows from a narrower into a wider portion of the tube; as, for example, from the sinus into the jugular vein.

Blood-vessel sounds which are pulsating and hammering in quality come from the internal carotid or the small arteries in and near the temporal bone.

The blood-sound is heard: (*a*) by increasing the resonance of the ear through closure of the air-column in the outer or middle ear, or the accumulation of fluid there;

(*b*) intensification of the blood-sounds through increased cardiac activity or local disturbances in circulation; (*c*) hyperæsthesia of the auditory nerve or the nervous central organs.

George P. Field¹: The pressure in the labyrinth is increased in Bright's disease, arthritic hemicrania, in cardiac affections, after quinine, salicylates, amyl nitrite, blood-letting. It is decreased in anæmia, especially when acute, and in chlorosis. Both increase and diminution of pressure may cause buzzing in the ears.

Ladreit de Lacharrière divides the noises into: (1) those which are characteristic of occlusion of the air-passages, the external meatus, and the tube; (2) those due to pressure on the labyrinth through the middle-ear organs; (3) those of labyrinthine origin from diseases of the inner ear; (4) those in the neighboring parts of the ear—pseudo-subjective noises.

Lennox-Browne believes that bilateral tinnitus signifies a constitutional, the unilateral a local, cause.

Douglas Hamming adopts: (1) occasional noises from tobacco smoking, chronic aural catarrh with inadequate contraction of the inner muscles; (2) buzzing ones from cerumen and foreign bodies in the outer ear; (3) bubbling ones from fluid in the tympanum; (4) continuous rustling from venous congestion of the labyrinth; (5) pulsating noises (*a*) from causes outside of the ear (aneurisms, anæmia), (*b*) from arterial engorgement of the labyrinth.

Hartmann distinguishes: (1) ringing (seething, singing, chirping), not infrequently occurring spontaneously, characterized by a constant note (after Hagen, *a*³); (2) buzzing (rushing, rumbling), with a lower quality. Some cases are nervous, accompanying brain tumors, labyrinth affections, with or without middle-ear trouble. A large part arises from the blood-current or muscular activity. Most frequently these noises are heard under conditions favorable to resonance in the ear, cerumen, polypi, secretions. Also in intensified sounds and hyperæsthesia of the auditory nerve. Hearing of melodies, human voices, etc., he attributes to cortical irritation.

¹ *Medical Times and Gazette*, 1878, June 8th.

Politzer alleges that unilateral noises sometimes are not noticeable until the better-hearing, or normal ear, is closed.

As regards the *frequency of occurrence*, tinnitus was found by Kramer in 70 per cent.; Eitelberg in 61 per cent.; Turnbull in 52 per cent. of all ear cases.

Politzer assumes subjective noises in two thirds of all ear patients, and considers the continuous ones the more unfavorable.

Concerning the varied course, Politzer writes: (1) first tinnitus, after months or years of difficulty in hearing; (2) more rarely the reverse; (3) both together, *e. g.*, in acutely beginning tympanic affections; (4) tinnitus and hardness of hearing increase uniformly; (5) just as frequently, the harder of hearing the less the tinnitus, which ceases with deafness; (6) rarely the noises increase even after deafness.

In regard to *prognosis* Kayser arrives at the general conclusion that continuous, double-sided, high-pitched noises, extending into the head, give an unfavorable prognosis, both in respect to the chance for cure and to the future serviceability of the organ of hearing.

Treatment.

Wilde and Gruber prescribe tincture of arnica, fifteen drops three times daily, increasing to thirty drops. Disadvantageous where there is congestion (Schwartz). Tepid baths, 25°-27° C., act sedatively where there is general nervous erethismus. The efficacy of muriate of ammonia in nervous tinnitus is corroborated by Kirk Dunkanson.

James Hinton, Hagen, found strychnine to have no effect.

Woakes and Hamming: hydrobromic acid three times daily, fifteen to twenty drops in sugar water.

Politzer employs the air-douche for noises accompanying middle-ear affections. Internally narcotics. During the increase, vesicants over mastoid; in syphilis, potassium iodide. According to Politzer-Türk, pressure on the mastoid diminishes the noises. Weil quieted noises with blowing at the ear, others he increased thereby, and still others were unaffected. The effect, he believes, is due to a sympathetic reflex, as, at the same time, the pupils dilate.

Since almost all former classifications of tinnitus aurium are based upon varying or contradictory assumptions as regards their origin, it became a matter of interest to me to discover, if possible, by means of most minute and uniform examinations of patients, some differential points based on the seat and cause of the noises. I have examined all patients suffering from noises in the ears from the following points of view. I noted down the age and sex of the patients, then the appearance of the tympanic membrane before and after inflation; furthermore, whether the tube was or was not patent, the tympanic cavity free from pathological contents. For the more exact consideration of the noise, I first noted the side affected, or its bilateral nature, whether it was uniform or pulsating in character, whether projected into the ear or outwards, whether notes or definite noises were heard. To determine approximately the pitch of the rumbling, hammering, blowing, or whistling sound also seemed to me to be of value. Furthermore, I inquired into the intensifying or allaying effects of exercise, use of alcohol, etc. Whether closure of the meatus strengthened or weakened the noise, whether it was perceptible to the examiner, whether inflation caused it to cease, finally, whether occlusion of the vessels in the neck had this effect,—all these were points for investigation. The examination was concluded by an accurate test of the acuity of hearing.

The most practical subdivision seems to me to be, just as with all other diseases of the ear, that based on the origin in the various parts of the organ of hearing, the outer, middle, inner ear, and the brain portion of the auditory nerve.

There remains, to be sure, a group of noises without interference with hearing, whose point of origin we often cannot even surmise, but which allow us to suspect their dependence upon the circulatory system. I shall discuss these separately.

Conduction-Sounds.

Since Bezold's important publications, we are in most cases of impairment of hearing able to locate the trouble by the functional examination. Just as sounds which in the open air, or even in a partially closed space, disappear

altogether may become audible or louder in an enclosed space, so noises which have been constantly present may become noticeable only when the external meatus is closed up or the chain of ossicles becomes rigid. We have here conditions similar to those present in the tests of Weber, Rinné, and Schwabach. Through some obstacle or other in the outward conduction of sound, the perception of sounds transmitted by the bones (and such are usually the ones present in the skull) is intensified.

The lower notes which require the conducting chain to transmit them to the inner ear are, when transmitted through bone, much more intensified by interference with the action of this chain than are the high notes, for the perception of which sound conduction by means of the ossicles is not necessary. From my investigations I am inclined to believe that of the noises originating in the head, only those up to c' are intensified through impeded outward sound conduction.

As types of pure interference with sound conduction, we may, according to Bezold, look upon the sequelæ of middle-ear suppuration. But, as is well known, these very cases so rarely are complicated by noises in the ears that I have not seen a single instance. I must, therefore, take the cases of chronic catarrh and typical sclerosis as my pure cases.

Among my eleven cases of this kind, only one, which for certain reasons was superficially examined and whose hearing was not improved by catheterization, had a sound in the third octave, all others ranging from c (128) to c' (256), rarely C (64 vibrations).

As impure cases of impediment to sound conduction I have adopted those of acute middle-ear suppuration, as I assume that in them there is at the same time not infrequently participation of the inner ear in the process. In three of them I found noises with the pitch c^s , c^s , and c^s .

In like manner cases of occluding cerumen or otitis externa, often strangely accompanied by loss of hearing for high notes, must remind us of "reflex" high notes; one case with sound c^s besides c^s .

A positive proof of the statement that sounds of the c

(128) octave are caused by hindrance in sound conduction is given by the beneficial effect of inflation with air. If, after the same, the noise disappears for a time, an obstacle to sound conduction, now removed, was the cause of the noise. It seemed to me, however, from my observations that even labyrinth noises may disappear after inflation for a very short time, a few seconds—of which more will be said below.

Among 6 acute cases in which inflation was performed the tinnitus disappeared in 1 and improved in 3. In the 1st case the buzzing of about 128 vibrations disappeared, but the beating remained as evidence of the arterial hyperæmia. The 3 improvements included 2 sounds of about 64 vibrations and 1 corresponding to about c^2 ; on the other hand, 2 noises that were unimproved corresponded to c^3 . In 14 cases of chronic catarrh 11 showed an effect after inflation. In 8 of these, all of which were between 64 and 256 vibrations, the noises ceased after inflation, in 3 it remained; of the latter 2 were pulsating in character.

A very interesting statement was made by one patient, who said that the note 128 remained away for a considerable time, while the note between c^2 and c^3 very soon became audible again. In one case, after several weeks of treatment, the low note disappeared, and a note, c^3 , which hitherto had rarely been heard, now appeared and did not disappear until after protracted administration of iron.

If we assume that impeded sound conduction is the cause of the noise, then the latter must be intensified if the impediment is increased. But not in all cases. For, in the first place, just that particular degree of tension in the conducting apparatus may be most favorable to the consonance of the blood-sound which has been established by the pathological process; in the second place, we often cannot by simply pressing the ear canal shut produce greater tension in the chain—for instance, in case of a rigid drum and hammer; in the third place, too great an increase of pressure might firmly fix both fenestræ and thus suppress all sensation of sound.

Intensification took place in a case of otitis media (note c 128), an acute catarrh of tube (g^3), in 3 chronic catarrhs

(128-256), and 3 scleroses (16, 128, c^3), in 3 cases with normal hearing (c^3 and c^3), 1 aneurism (?), and 1 case of nervousness. Strong pressure diminished the noises in 8 cases (g^3 , 3 times c 128, twice c 64, and once C 32), intensified in 4 cases (128-256), and caused a roaring sound in 1 case where only a high note, c^3 , existed before.

These tests also show that the low notes up to 256 are chiefly the ones of middle-ear origin and due to defects in conduction, but the results are less certain than comparisons with the functional examination and inflation.

The other questions relating to the nature of the conduction-noises may be treated more briefly. Seventeen times it was completely or mainly unilateral; 4 times bilateral or changing from side to side. Uniform noises were present in 15 of these 20 cases, pulsating ones 4 times, and once an occasionally pulsating noise. The pure conduction-noise may, therefore, as a rule, be considered a venous sound.

Rest in bed caused increased perception of the noises in 3 acute cases (c 128), 1 with g^3 , in 9 chronic cases (3 times 128, 3 times 64, once 64 with occasional c^3 , once 32 with occasional c^3), sometimes enough to prevent sleep. Inasmuch as all inner noises can be drowned by loud surroundings I do not believe that investigations in this direction would give us any clue as to the origin of the noises.

Alcohol and exertion increased the tinnitus (64 to 256 vibrations) in six cases. Certain melodies were heard by only one woman with a nervous as well as syphilitic taint. After all other remedies had been exhausted I tried in vain to remove the stapes. Even if all of the sound-conducting apparatus with the exception of the plate of the stapes has been removed, I still do not think it impossible that the source of her noise (c^3) is located in the fenestræ. The assumption of Wilde, Urbantschitsch, Hartmann, Brunner, Kayser, that when whole melodies are heard, the seat of the lesion is central, is indeed very plausible, but in tainted subjects entirely extraneous causes may be interpreted as being of a higher order and may produce actual illusions, as is shown by the investigations of Köppe-Schwartz.

Schwartz, for instance, treated a woman with an hereditary

psychical taint locally for tinnitus with success. With this the hallucinations also vanished, and she was saved from a threatened outbreak of insanity.

Most patients projected the noises so well known to them inwards, but I know from my own experience that even after a long duration passing deceptions may occur if very similar noises arise outside.

The comparisons usually made in cases of defective conduction are with the roaring of trains, waterfalls, hydrants, ocean, etc. When the pitch of the sounds has not been examined, and the above comparisons are made, we may assume the sounds to have from 16 to 256 vibrations.

The examiner could never perceive the conduction-noises.

Reflex Sounds.

The link between tinnitus accompanying middle-ear affections and that of labyrinth troubles are those noises which I, following former authors, shall designate as reflex sounds or noises. The reflex may act either upon the nerves of the internal muscles, those of the vessels, or upon the auditory nerve directly. The nature of the noise will vary accordingly.

If the chain of ossicles is fixed by reflex spasm of the muscles, conduction-sounds of low pitch will arise; if arterial hyperæmia is produced, pulsating sounds will arise; if the auditory nerve is stimulated, those high notes, to be discussed later, will be caused which have their origin in the inner ear and the nerve.

The whole group of reflex sounds, therefore, is characterized by the fact that they are not accompanied by impaired hearing, whereas tinnitus of middle-ear or nerve origin will sooner or later show some impairment of hearing.

According to Brunner reflex ringing occurs with closing of the eye, shaking of the head, stroking or pressing upon both tragi (Zaufal).

Schwartz mentions reflex tinnitus through the trigeminal in toothache, especially of the posterior molars.

Reflex tinnitus was noticed by Tröltzsch in combination

with blepharospasm due to a cramp in the orbicularis and stapedius which are supplied by the facial. A similar case in an hysterical subject is described by Wreden. Jacobson describes an objectively noticeable spasm of the tensor tympani when the eyes were firmly closed. The same author thinks tinnitus may occur as a reflex from the stomach during severe hunger or dyspepsia.

Schwartz observed a case of typhoid in which the buzzing was cured with purgatives, and once tinnitus accompanying a cardiac lesion.

Gottstein observed a patient with attacks of blepharospasm which were regularly preceded by noises in both ears. These ceased as soon as pressure was made with the finger upon a certain point on the mastoid process.

The pitch of reflex sounds is varied. After the tests of the noises in pure diseases of sound conduction on the one hand and pure nervous affections on the other, I am inclined to attribute here also a muscular origin to the low notes and an origin from the inner ear to the high ones.

Tinnitus Due to Affections of the Inner Ear and the Nerve.

In 1853 Heinrich With divided the subjective noises into reflex sounds and such as are produced by changes in the substance of the auditory nerve itself. The causes for the latter he finds in chemical changes in the composition of the blood, *e. g.*, in typhoid, cholera, chlorosis, etc., and in physical pressure from overdistended vessels, extravasations, or other pathological products.

Moos thinks of the possibility of mechanical irritation of the nerve by calcareous deposits.

Brunner considers the noises in the ear, just like light-perception from pressure on the eyeball, to be mechanically produced, and not to represent an irritation of the end organs of the auditory nerve in the labyrinth. With electrical stimulation, Brenner found c' and g' , Brunner, c' , Hagen, a' .

Zaufal observed a piano-tuner who distinctly heard the note c' when pressure was made upon the tragus.

Benedict says "that all factors that favor atrophy of the

auditory nerve also produce the most favorable conditions to make tinnitus possible."

Theobald believes that the auditory nerve is just as little sensitive to sound as the optic nerve is to light.

Gradenigo considers it to be a fact that "the sound-perceiving apparatus reacts to mechanical, acoustic, electric, or vascular stimuli with a very sharp note, whose pitch is almost constant with each individual (tinnitus aurium c^4 , c^6). There exists, therefore, a group of auditory cells which are particularly susceptible to these stimuli. The nerve- and labyrinth-sounds may be absent in pathological processes that have less an inflammatory than a degenerative character, and also in rapidly progressing processes which have not been preceded by a marked stage of irritation."

Haug observed in typhoid and mumps with labyrinth complications intense buzzing, rumbling, and ringing. In tabes, especially when complicated with amblyopia, the ear affection usually begins with tinnitus, which often disappears as deafness increases. Syphilis shows itself in the ear sometimes by nothing but noises of various kinds.

Kayser describes a case of CO poisoning with severe noises and deafness.

Kirchner noticed in animals which for several days had been given quinine and salicylates (1-3 gr.) marked hyperæmia and hemorrhages of the tympanic mucous membrane, and also in the labyrinth, cochlea, semicircular canals, and pia and dura mater.

Malaria with intermittent noises in the ear was observed by Haug and Urbantschitsch. Almost all authors consider the continuous noises to be more unfavorable than the intermittent ones.

After this review of the statements in literature, let us look at the various cases.

Into the second larger group I have put the 8 cases of "mixed" dysacusis. Among them we find in five buzzing of 64-128 vibrations, and in three higher notes, c^3 - c^4 .

One of my cases I consider to be pure hyperæsthesia acoustica for its own blood-sounds. The note was between 128-256, disappeared shortly after catheterization, without

pressure upon the cervical vessels, became louder after mental work and gentle closing of the ear. Hearing was almost normal.

I was able to gather only three cases of tinnitus with pure nerve affection. Two of them had notes c' and c'' ; one had 258 on the deaf ear, which sound was probably transmitted from the tolerably healthy one. Pressure upon the meatus was without influence. Inflation can have only a transient effect upon the inner ear, which seems to consist in a sort of pressure paralysis of the labyrinth. The tinnitus in my cases was twice uniform, once also pulsating, was always projected into the ear. Melodies were never heard. Twice it was designated as buzzing and roaring, twice it was increased with exertion, once it was increased during rest in bed, and once quieted by it; in two cases the catheter produced slight effect, once for a few seconds, and once (note 256) for a few minutes.

A considerable number of additions to these few cases in otological literature I found.

Toynbee describes several cases of tinnitus which are ascribed to injuries of the inner ear. 1. Blow upon right ear. Thereafter permanent ringing. Membrane and hearing normal. 2. Fall from horse; hemorrhage from ear; constant singing noise. 3. Fall from wagon. Noise of a teapot in the deafened right ear. Slow improvement. 4. After coughing, loud singing noise. 5. After pistol-shot, hissing sound. 6. Cannon-shot close to ear, singing and whizzing sound. 7. After loud shouting by a fishmonger, ringing and rustling in left ear. 8. After explosion of gas, loss of hearing and singing in ear. 9. During skating in very cold weather, sudden singing sound.

Turnbull: Cannon-shot close above the head; unconsciousness, dizziness, headache. Nausea and vomiting for three days. Left ear totally deaf without noises; right side, impairment of hearing, ringing, and rustling.

Tröltzsch mentions the finding of hyperæmia, ecchymoses, and infiltrations in the labyrinth, and bases the noises upon these causes.

Lucae: 1. Deafness following hemorrhage into labyrinth,

preceded for three days by ringing. 2. After gun-shot, ringing for five minutes. Then defective hearing, with buzzing and weakened perception of high tuning-fork sounds.

Burkhardt-Merian: After locomotive whistle, continuous high whistling and deafness on both sides for notes above c' .

Kiesselbach: 1. After blow on ear, ringing of pitch f' . 2. After loud blast from trumpet, high whistling, diminished hearing, sensitiveness to noises, dulling of high notes.

Moos: After severe coryza, high ringing on right side whenever a dinner-bell or continuous whistling was heard. Low notes were perceived one third note higher.

Wolf describes the following cases of labyrinth disease with noises: 1. Age forty, shot fired in closed room; steady singing of pitch c' . 2. Age twenty-three, after consumption of wine, buzzing in the middle scale. 3. Age twenty-eight, after sneezing, sudden roaring like a waterfall. 4. Age five, meningeal symptoms; hears notes of an organ, voices, whistling on both sides; dizziness. 5. Age fourteen, cerebro-spinal meningitis; seething of water, hissing, poor perception of high notes, dizziness. 6. Age thirty-five, severe injury of mastoid process; hears roaring, rumbling; dizziness. 7. Age forty-two, blood-poisoning; first low hissing, then high rustling. 8. Age forty-two, blood-poisoning; dizziness, thumping, sounds of organ. 9. Age forty-seven, syphilis; mercury treatment; pulse-sounds and intense metallic ringing; low notes retained, high ones lost. 10. Age twenty-seven, after puerperium, low sounds heard; gentle hissing. 11. Age fifty-seven, diabetes; some buzzing, gradual disturbance of hearing. 12. Age forty-one, glaucoma; loud hissing, no impairment of hearing. 13. Age eighty-two, glaucoma; buzzing, diminished hearing.

Brunner: 1. Chemist hears after each explosion of gas a high, clear, protracted, and very annoying sound. 2. Basal fracture; roaring and other sounds, deafness. 3. Blow with stick upon ear; continuous ringing. Tympanum normal.

From these observations it becomes evident that in injuries

of the labyrinth preferably notes of the higher registers arise, for the nerve fibres corresponding to the lower tones are the most remote from the fenestræ and have a protected position in the interior of the nerve trunk. We are but rarely able to differentiate between solitary affection of the nerve and labyrinth. The symptoms of a brain tumor or participation of neighboring nerves may then aid in diagnosis.

Tinnitus in Consequence of Disease of the Auditory Nerve.

Some patients of Wilde who first sought advice on account of noises in the head and singing, having good hearing and no other aural affection, later became afflicted with senile paralysis, "which probably came from softening of the brain." Others with tinnitus without objective lesion died of apoplexy or paralysis. Trölsch had the same experience.

Politzer: In cerebral affections noises are very frequent, e.g., in hyperæmia, softening, and tumors. Very loud noises without objective lesions in the ear and with deafness are suggestive of central trouble.

Kayser believes that in diseases of the central nervous tracts (pons, posterior corpora quadrigemina, etc.) indefinite noises arise, while in cortical disease of the temporal lobe more or less clear sound-pictures, melodies, and the like, are heard. But I have already mentioned above that hearing of melodies may also appear in permanently peripheral diseases.

Brunner considers connected melodies to be a central symptom; once he observed them after large doses of quinine.

Schalle describes a case of apoplexy of the auditory and facial nerves without noises, but complete deafness.

Moos and Bürkner explain the absence of all auditory sensations in sarcoma of the nerve by the complete interruption of all centripetal impulses.

Siebenmann found among 58 tumors of the region of the corpora quadrigemina, impairment of hearing 11 times,

noises only twice, and these only at the beginning of the trouble.

Ludwig Linsmayer: Patient sixty-five years of age, with old sclerosis; sudden cardiac oppression and tremendous noise in both ears, with sensible and senseless words, which soon changed to hallucinations. General arteriosclerosis. Unsuccessful ligation of right carotid followed by complete hemiplegia. Noises in ears unchanged, complete deafness on left side.

Blood-Sounds without Impairment of Conduction.

Just as inordinate conduction to the inner ear may render audible otherwise imperceptible noises, so blood-sounds may, while conduction remains normal, become noticeable by being intensified. This may be accomplished by increased cardiac activity, exertion, excitement, copious meals; locally by formation of aneurisms of vessels near the ear, etc. Furthermore, blood-sounds originating at a greater distance may reach the ear, *e.g.*, in struma and heart lesions. Thirdly, the sounds which the observer himself may hear over large vessels in anæmia and chlorosis may cause noises in the ears.

Hippocrates, according to Urbantschitsch, already designated the tinnitus in anæmia as autoauscultation of the vessel-sounds.

Tröltsch mentions tinnitus in chlorosis, originating from the jugular bulb, also in struma and wearing of tight collars.

Orne Green gives as causes of the blood-sounds:

1. Partial stenosis of internal carotid.
2. Diminished vasomotor tension of the carotid.
3. Aneurisms of vessels of the head.

Lebert considers rhythmic arterial sounds with more or less deafness, dysphagia, and signs of beginning paralysis of the vagus like dyspnœa, slowing and then acceleration of pulse, as a group of symptoms belonging to aneurism of the basilar artery.

Following are the cases of aneurism near the ear causing noises, which I was able to find:

Tröltsch mentions noises accompanying aneurism of the

basilar artery; Turnbull, of the temporal artery; Herzog and Kayser, of the posterior auricular; Spencer, of the middle meningeal; Wagenhäuser, of the carotid in the bony canal.

Poorten (Riga): Blow on the left parietal bone. Two weeks later light hammering; later, loud noise isochronic with pulse, objectively audible over the whole left, later also right side of the head. Compression of carotid of no avail. Soon exophthalmos ensued, due to aneurism of the ophthalmic artery [probably not aneurism but arterio-venous communication in the cavernous sinus. H. K.]

Tuczek observed a sound with double the frequency of the pulse, that could be heard for 12 *cm* in front of the opened mouth. Firm tamponade of the left external meatus caused it to disappear altogether. There was probably an aneurism of a branch of the posterior auricular artery.

Sounds of Uncertain Origin.

Orne Green: Two cases of subjective and objective pulsating sounds, without cardiac or vascular lesion and no anæmia nor ear disease.

Wilh. Meyer: Objective and subjective pulsating sound, with good hearing on both sides, quieted by compression of the carotid. Heart sounds normal. Strong inflation produced complete cure on right side, but was impracticable and unsuccessful on the left.

Teldy observed an objective, rhythmical sound, which ceased at once when the carotid was compressed.

Meyersohn: A sound, audible with the stethoscope on the skull, ceased with compression of the carotid, but stayed away only four hours after ligature of the vessel.

Brandeis: Boy of nine years, inflammation of second, third, and fourth cervical vertebræ. A corset removed the noises, headache, and other complaints, which reappeared when the corset was left aside.

Woakes explains such sounds by assuming pressure upon the vasomotor nerves from the inferior cervical plexus,

widening of the vertebral artery, and congestion of the labyrinth.

Sounds Accompanying Struma.

Haug saw a man of forty-two with struma and continuous roaring in ears that became stormy with bending down. Cured by operation for struma.

Brandeis saw a similar case. He thinks of venous hyperæmia of the labyrinth, due to congestion of the veins of both aqueducts.

Sounds Accompanying Atheroma.

Marian: After apoplexy with paresis of ocular and facial muscles of left side, noise in left ear corresponding to pulse. Ear drum retracted. Second aortic sound strikingly clear, so that Marian thinks of atheromatous cerebral vessels.

Jacobson observed tinnitus with pronounced arteriosclerosis. The beating in the ear occasionally intermitted with the pulse.

Sounds Accompanying Cardiac Lesions.

Spirig, in a case of aortic insufficiency, heard through the otoscope a rhythmical, soft, blowing sound on the right side. It was audible over the aorta, right carotid, subclavian and brachial arteries. Plain capillary pulse on forehead and at the nails. Subjectively, at first pulsating, later continuous, sound.

Haug also observed a sound accompanying valvular lesion.

Sounds Accompanying Anæmia.

In a patient anæmic after parturition I was able to suppress the sounds as long as I made pressure on the cervical vessels. During rest in bed the tinnitus was stronger. It ceased permanently after the use of iron. In this, as well as another case with anæmic sounds, the latter ceased for a few seconds after inflation. In neither could they be heard objectively.

Meyersohn was able to suppress an objectively audible venous sound by pressure on the cervical vessels.

CONCLUSION.

The conclusions that I may draw from the cases hitherto published, as well as from my own limited but more carefully made observations, are as follows :

1. Almost all sounds should be designated by their pitch.
2. The pure conduction-sounds arise from the diminished outlet of sound, due to rigidity of the conducting apparatus. Inasmuch as the motility of the latter is required for hearing only low notes, its fixation is an obstacle to the outlet of these notes alone. Pure conduction-sounds are mainly placed between 16 and 256 vibrations.
3. The higher pitched sounds are due to processes in the inner ear. This statement is sustained by their occurrence in normal persons after such influences as are known to injure the inner ear, and also by the effect that therapy has upon them. They may be produced (*a*) by reflex from the external meatus, middle ear, and many different parts of the body ; (*b*) by changes in the inner ear or the nerve itself. In rare cases, however, low sounds may, perhaps, also originate in the inner ear.
4. Hearing of complex sounds like melodies, etc., is not *prima-facie* proof of a cerebral affection.

In respect to treatment we may formulate the rule *not to perform any grave operations upon the conducting apparatus when the sounds heard are high pitched, and especially not to attempt removal of the stapes.*

REPORT OF THE EIGHTH MEETING OF THE GER-
MAN OTOLOGICAL SOCIETY IN HAMBURG
MAY 19 AND 20, 1899.

BY DR. P. RUDLOFF, OF WIESBADEN.

Translated from Band xxxv., S. 147, 1899, of German Edition, by Dr.
ARNOLD H. KNAPP.

MORNING SESSION, MAY 19TH.

KISSEL, Jena, opened the meeting with an historical survey of the development of otology, and made a plea for the establishment of special departments for otology at the various universities.

1. R. PANSE, Dresden. **Description of specimens on the comparative anatomy and physiology of the so-called auditory organ.**

With the aid of anatomical and microscopical specimens, drawings, and models, the size, direction, and breadth of the semicircular canals of the sacculus utriculus and of the lagena are shown to stand in a definite relation to the main movements in the various animal classes. Transmission of waves of the surrounding water and of the air take place, first on the appearance of the pars basilaris and the simultaneous appearance of the ductus perilymphaticus and of the oval window.

Discussion : KISSEL, ZARNIKO, BEZOLD, SCHEIBE.

2. STEINBRÜGGE, Giessen. **On changes in position of Reissner's membrane ; with demonstrations.**

A peculiar change in position of Reissner's membrane was noticed in the left cochlea of a man, eighteen years of age, who had died of a general miliary tuberculosis. At autopsy, traces of transient and, especially in the last stages of the disease, of increased intracranial pressure were found present. The right cochlea seemed normal, but Corti's organ on the left side was

atrophied and reduced to a small group of cells. The other structures of the ductus cochlearis showed signs of a previous inflammation. Reissner's membrane at the first turn was very much depressed, so that the ductus cochlearis seemed diminished; in the middle turn it was adherent to the crista spiralis for a short distance and then ascended to its place of attachment to the spiral ligament. In the superior turn it rested upon the membrana tectoria and Corti's organ, and rose from there directly upwards. This adherence is supposed to be due to the membrane being pushed against the ductus by the preponderance of pressure within the perilymph. The specimens also show that the endolymphatic fluid had resisted this pressure to a certain extent, as the free part of Reissner's membrane still appeared tense. (Demonstration of specimens.)

Discussion: SIEBENMANN.

3. SIEBENMANN, Bâle. **Demonstration of three cases of closure of the fossula fenestræ rotundæ.**

Politzer (*Comptes rendus du IV. congrès internat. d'otologie*, Bruxelles, 1899) found the fossula fenestræ rotundæ in the suppurating ear of a patient who had died of phthisis to be completely filled with adipose tissue, and in a second case a bony constriction of the fossula and closure with fibrous tissue containing fatty elements. The following three specimens were demonstrated:

(1) From a typhoid patient. The entire fossula is filled with pure fatty tissue. A large, slightly branching vessel passes through the midst of this tissue from the tympanum in a horizontal direction to the postero-lateral depression of the niche and then backwards and downwards through the bone to the jugular bulb (canalis accessorius aquæductus cochleæ).

(2) In the second specimen, also from a typhoid patient, the fossula fenestræ rotundæ is filled with fatty tissue only in its upper part. The lipoma as well as the remaining tympanic mucous membrane showed dilated vessels and interstitial extravasates of blood.

(3) In the third specimen the tympanic mucous membrane is thickened and the fossula is filled with a loose cellular connective tissue, through which fat cells are scattered.

As the membranous tissue which usually occupies the fossula does not contain any fatty elements, the question as to their origin presents itself. There are three possibilities:

(1) There may be a perivascular collection of fat as it occurs in the ocular conjunctiva. (2) The fatty deposits in the mucosa of the niche of the round window may be regarded as analogous to the fat nests which, according to Siebenmann's investigations and from a verbal communication of Scheibe's, are regularly present in the immediate or distant surroundings of the tensor tendon and of the facial canal and in other regions of the tympanic mucous membrane. (3) The fat has entered from one of the medullary spaces which adjoin the pneumatic cells of the middle ear.

The author has published in these ARCHIVES an experimental attempt to discover the effect of the closure of the round window niche on the tone perception as regards the higher tones. For the lower tones the pathological material proves to be unsuitable.

AFTERNOON SESSION.

4. KAYSER, Breslau. **An osteoma of the external auditory canal; demonstration.**

This was an unusually large bony tumor (17 mm long by 11 mm broad) attached to the posterior superior wall at the outer end of the right ear canal. The patient, forty years old, had suffered from a transient otorrhœa during youth. Seven years ago, an exostosis had been noted. In 1898, severe headache set in, and the auditory canal was completely filled by a smooth, bony hard tumor covered with a thin layer of delicate skin. At the operation the tumor became detached at its base after a few blows with the chisel, and was lifted out with difficulty. The root proved to be a small ridge near the upper margin. Healing was prompt, after a lot of pus was evacuated. The *Mt* showed a perforation at its posterior part. The discharge from the middle ear ceased, and hearing was much improved. The tumor was cancellous in structure.

5. SCHMEDEN, Oldenburg. **A tumor of the petrous portion; demonstration.**

A woman, twenty-eight years of age, had been hard of hearing for four years, without otorrhœa, but marked tinnitus, vertigo, and headache for two years. During the last month she complained of hoarseness and palpitation.

There is a small nodule in the lower and back quadrant of the drum which bleeds on the slightest provocation. Hearing very much diminished, but tuning-fork placed on mastoid process is perceived. Pupils are equal, no changes in fundus. Total left

recurrent paralysis in larynx. The pulse varies between 90 and 130. Heart normal. While in the hospital patient would lie in bed partly on the abdomen, supporting the head on the arm or hand. She would turn on her back when requested, but would soon resume the old attitude. The gait was staggering; she always sought a support. When sitting in a chair, she could move her legs. Later fever, otorrhœa, and facial paralysis appeared. At the operation there was very free hemorrhage from the bone, antrum, and middle ear; the latter was found filled with tumor masses. Further operation was abandoned. Fever and tinnitus at first disappeared, but reappeared on the seventh day. The patient became unconscious and died in coma, occupying the accustomed peculiar position.

At autopsy, meningitis with extreme hydrocephalus internus was found, and in the pyramid of the petrous bone there was a large tumor. The entire pyramid, except labyrinth, and the mastoid process were invaded. The jugular bulb was obliterated. In the region of the jugular fossa, the tumor had enlarged to the size of a walnut and extended upward through the jugular foramen projecting into the cranial cavity.

Microscopical examination revealed a small alveolar sarcoma.

The clinical symptoms, in short, were tinnitus, vertigo, peculiar position and motion, hoarseness, and palpitation. The first three symptoms are easily explainable. The tumor growing through the jugular foramen had pressed upon the cerebellum and the crus cerebelli ad pontem and caused the forced position. The vagus, glosso-pharyngeus, and accessories were also pressed upon. The paralysis of the left vocal cord and the rapidity of pulse are explained by pressure on the vagus.

Discussion: KREBS reported a case on which he had operated, where a large cyst was found in the petrous pyramid and was partially removed.

KÜMMELL said that these cysts were not well understood and only a few cases had been reported.

PANSE mentioned the fact that a similar case had been reported by Gomperz, and that in this case the tumor might have been a cholesteatoma which had disintegrated in the centre.

PASSOW had operated on a case for presumable mastoid complication after purulent otitis; a round-celled sarcoma was found.

HARTMANN described a case of round-celled sarcoma, when at autopsy a firm connection with the dura was present, which would have rendered operative intervention futile.

SCHEIBE described a case of sarcoma of the mastoid process which was permanently cured by operation.

6. SCHEIBE, Munich. **Rapid decay in acute scarlatinous otitis; histological demonstration.**

This was an unusually severe case of scarlatinous otitis which ended fatally, and where while under observation a rapid destruction of the *Mt*, loss of ossicles, and putrid decomposition of the secretion occurred.

A child, six years of age, was taken ill with scarlet fever; at the beginning of the second week the right ear became affected, one week later the left, with diphtheria of the pharynx, lobular pneumonia, and pleurisy; death in the fifth week.

At autopsy: pronounced emaciation, gangrenous diphtheria of pharynx and larynx, purulent lobular pneumonia in all lobes fibrinous purulent bilateral pleurisy, acute parenchymatous nephritis, and dilatation of left ventricle.

Right ear: Total absence of drum, sulcus tympanicus bare and rough, ossicles necrotic, muscles destroyed, bone in several parts of the tympanic wall eroded, some of the pneumatic cells in the mastoid filled with pus, inflammatory changes in the Eustachian tube. The same changes in the left ear.

The labyrinth on the right side is not affected. This is of interest, as from the functional examination (no whisper heard, numbers in ordinary voice only heard in immediate vicinity) a complication of the internal ear was suspected. The labyrinth of the left ear showed inflammatory changes.

It seems probable that the loss of hearing was caused by the destruction of the muscles of the ear.

Discussion: BEZOLD, JANSEN, PANSE, BRIEGER, PLUDER, report similar cases. DENKER suggests that in these cases where the loss of hearing is so marked and conversational voice can only be heard at 5 cm distance, examinations with tones, especially with determination of the hearing duration for tuning-fork tones, should be made. Autopsy had shown that in the above case the morbid process was localized to the middle ear. It would be of interest to confirm with tuning-forks if such a degree of deafness present on both sides could be followed by deaf-mutism caused by an affection of the middle ear or by a lesion in the labyrinth, not recognizable by the microscope but functional in character.

7. LUCAE, Berlin. **Examination of tones in the deaf.** A low and a high tuning-fork (c and c_4) were exhibited with appli-

ances for striking which had previously been shown by the author. He believed that with these the hearing duration could be more accurately determined than with the usual forks.

8. ZIMMERMANN, Dresden. **The value of our examination with tuning-forks, based on the re-examination of Helmholtz's theory.**

The acceptance of two sound-transmitting ways differing in character, air-conduction, and bone-conduction, was at first justified by clinical observation, and later from the results of the tuning-fork tests. Of these results the principal one, gained by Rinné's experiment, was susceptible to attack because it showed a better conduction by air, while physics teaches us that bone is several times a better sound conductor.

On closer examination it became evident that in previous tests with tuning-forks the base or handle of the fork and the prongs were considered of equal value. In the usual Rinné the handle of the fork is placed on the mastoid, and as soon as the sound is no longer perceived the other end of the fork or the prongs are brought near the ear. If, more correctly, the handle of the fork is placed near the ear in the second part of the experiment, it will be found that the sound will not be perceived after the handle can no longer be heard on the mastoid. The contrast which is usually found in the sequence of the test, and which was regarded as a contrast of the two ways of sound conduction, is explained, by the physically proven antithesis of the handle and prongs of the tuning-fork.

Other improbabilities seemingly proven by tuning-fork tests had led to the re-examination of previously accepted theories, and especially the one given out by Helmholtz on the synchronous vibrations of the drum and the ossicles.

The author has already drawn attention to the fact that in the usual sound conduction the progressive sound waves are not transmitted to the labyrinth by in-and-out motion of the plate of the stapes. They are transmitted through the substance of the drum without causing synchronous vibrations of the ossicles or stapes, then molecularly on the air in the middle ear, and finally directly to the cochlear capsule. The latter takes up the progressive wave motion and hands it over to the labyrinth fluid, where the sympathetic fibres of the terminal organ are brought into vibration.

This interpretation shows that fundamentally in sound convey-

ance there is only one way : the bone conduction is always the last and shortest part of the entire way which the sound has to travel even by air-conduction. The various distances and the various obstructions caused by intervening media explain the purely quantitative differences in the tuning-fork examinations which normally show a better sound perception for the handle direct through the bone.

The order of experiment may be changed in numerous ways as the conditions for one or both parts are modified. In the latter cases both parts must show similar changes. In the case of diminution of the perception as in senile years, hearing duration diminishes for bone-conduction as well as for air-conduction. The apparent inconsistency in those cases where a prolongation of the perception for bone-conduction is present in diminished or absence of perception for air-conduction does not seem improbable, but is only an expression of a disturbance in the ossicular chain.

Zimmermann regards the physiological purpose of the ossicular chain as a reflex accommodative apparatus ; as in the eye the ciliary apparatus furnishes the necessary space limits for the distinct perception of the rays of light, so the drum and ossicles in the ear supply the necessary time limits for the clear perception of the sound waves. The labyrinth fluid is so arranged by graduated, reflex, in-and-out movements of the stapes plate that the fibres in the terminal organ may vibrate in the amplitudes of distinct hearing. This mechanism is especially necessary for the exact functioning of the fibres vibrating in large amplitudes, and for the low tones.

This also agrees with the tuning-fork tests. If the accommodation is faulty, the vibrations of the base of the tuning-fork in bone-conduction will not cease precisely with the last sound vibration, but continue the longer the greater the degree of accommodative disturbance, and often so long that the prongs of the fork again approached will cause no sound vibrations. Subjective noises in air-conduction accompany this after-vibration in the bone, and the affected ear can no longer limit the tones and noises of the vicinity in their proper amplitude.

The author finally describes the unanimity which air- and bone-conduction show to one another and to other accompanying morbid symptoms, and thinks that from this new point of view tuning-fork tests furnish the most valuable diagnostic aid.

Discussion : BEZOLD : It is not admissible to take the difference in vibration between the prongs and the handle of the tuning-fork as an explanation for the different duration of air- and bone-conduction. Both are in motion for an equal length of time, but the movements of handle, just as a two-armed lever, are smaller but of a corresponding greater intensity.

ZIMMERMANN : The audible vibrations in the fork handle cease earlier than those at the ends ; this can be demonstrated with the tuning-forks where the simultaneous perception of the ends is excluded and which are in constant use, as Hartmann's small C fork or A fork. Diagnostically the handle and prongs of a tuning-fork are not equivalent.

SATURDAY, MAY 20TH.

STEINBRÜGGE, before the commencement of the regular meeting, presented a boy, thirteen years old, with anomaly of both auricles and absence of ear canals. In the boy's first year an attempt was made to restore the canal on one side, though without success. Notwithstanding the anomaly, the boy's hearing is excellent, and permits him to go on at school. The ticking of a watch (normally 6 *m*) is heard, right close to the ear ; left at 00.2 *m* ; whisper near the ear ; medium conversation at 1 *m*.

9. RUDLOFF, Wiesbaden. **Demonstration of macroscopic and microscopic specimens.**

These specimens are shown in connection with the author's paper "On the Operation for Adenoid Vegetations with Dependent Head in Narcosis."

(1) A number of negative impressions made from plaster casts of the lateral wall of the naso-pharynx. They show the relation between Rosenmüller's fossa and the pharyngeal opening of the Eustachian tube and the great variations in the depth of these structures. Rosenmüller's fossa has usually a much greater depth than is mentioned in Merkel's *Topographical Anatomy*. Merkel states the depth at 6-7 *mm*, while Rudloff found in 15 specimens the depth to vary between 7 and 17 *mm*. Two of the casts were made from the child's naso-pharynx.

(2) A portion of hyperplastic adenoid tissue in combination with a small, 2 by 1.5 *mm* large, piece of cartilage from the tubal ridge—*i. e.*, a part of the anterior wall of Rosenmüller's fossa removed in using Hartmann's curette.

(3) Two microscopic specimens of adenoid tissue firmly connected with a small piece of cartilage from the pharyngeal ostium of the tube. There are striking changes in the cartilage, namely, cavities surrounding single cartilage cells and vessel channels.

(4) A macroscopic specimen showing the relation of the connective-tissue sheath which surrounds the carotid and the vessels and nerves passing from the head to the neck in the lateral wall of Rosenmüller's fossa.

Discussion : THOST is opposed to the statement that adenoid tissue occurs in the tube because adenoid tissue and tubal cartilage are shown in combination in the specimen. He regards the process to be due to adhesions between hyperplastic pharyngeal tonsil and tubal ridge and so are removed together at operation. The term adenoid tissue had better be dropped for the expression hyperplasia of the pharyngeal tonsil.

RUDLOFF : The specimens which have just been shown furnish an unmistakable proof that hyperplastic tissue may be present at the tubal ridge. Its presence there cannot be explained by the statements of the preceding speaker, but rather is to be considered as adenoid tissue which is present there normally and becomes hyperplastic, as it occurs in other parts of the nasopharynx. The term hyperplasia of the pharyngeal tonsil is perfectly proper, but it must not be imagined that the hyperplastic tonsil is a sharply described structure occurring at the typical position in the nasopharynx. In all parts of the nasopharynx where adenoid tissue is present, hyperplasia of the tissue may take place.

SCHWABACH : I am not of the opinion that the pharyngeal tonsil is not a circumscribed structure. Embryologically it resembles the palatal and lingual tonsil. In all three the adenoid tissue develops about a depression in the mucous membrane. Aberrant adenoid tissue may appear in other regions of the nasopharynx, as Teutleben has shown, for the tubal ostium, and later Disse, who speaks of a ring of adenoid tissue.

BRIEGER : Adenoid tufts about the tubal ridge are very unusual. In hyperplasia of the adenoid pharyngeal ring, the adenoid tissue everywhere takes part, not only near the Eustachian tube but also in the floor of the nose.

10. REINHARD, Duisburg. **Contribution to excision of the malleus and incus.** A young woman, twenty years old, had suffered from chronic purulent otitis since childhood and the

two outer ossicles had become necrotic. All attempts at bringing the otorrhœa to a stop had failed. Hearing had so diminished that whispered numbers were only heard at the ear. The *Mt* was destroyed except a smaller upper rim where a granulation presented through a perforation directly behind the short process; the tympanic mucous membrane was swollen and covered with thick pus; a rudimentary part of the handle of the malleus remained. The ossicles were extracted according to Schwartze through the canal. Carious places were found on the hammer at the head, and on the incus at the long process and the body. Otorrhœa ceased after three weeks, the tympanic wall became epidermized, and hearing improved to 5 *m* for whispered numbers.

The author pleads for a more frequent application of this mode of treatment and from the statistics of Ludwig, Grunert, and his own, finds that in 51 % of the cases the otorrhœa ceases, hearing was improved in 53 %, in $\frac{1}{3}$ of the cases it remained unchanged, and in $\frac{1}{3}$ hearing diminished.

The last condition has deterred the author from removing the ossicles in cases of deafness on one side and attic suppuration on the other, without any cerebral complications, which was only to be treated by excision of the ossicles. He usually waited under these circumstances, watching the case carefully. At the onset of any cerebral symptoms operation was of course resorted to at once.

Discussion : STACKE : The interpretation of the indications for operation in these cases has changed during the last years. Formerly it was generally accepted that the excision of the outer ossicles from the canal was a smaller and less important intervention and in doubtful cases preceded the radical operation.

Two years ago, at the meeting of this Society, I said that in cases where the drum was principally preserved, and it could be assumed that the malleus and incus were sound but that otorrhœa could not be cured without operation, the radical operation with preservation of ossicles *in situ* should be attempted and so generally cure the discharge and preserve the hearing. I have observed one case where the hearing rose from $\frac{1}{2}$ *m* before the operation to 6 *m*, at which it remained.

Other cases were equally favorable so that I endeavor to preserve the ossicles especially when their ligaments are still intact. These are surely intact in the case quoted by Reinhard where whisper was heard at 10 *m*. In that case, as the otorrhœa is not

to be healed without operation, in my opinion the radical operation with preservation of the ossicles is indicated.

Of course, we do not always know to what extent the ossicles are affected. The ossicles can always be removed later should their preservation prove needless. It should be borne in mind that not very extensive carious foci on the lateral wall of the ossicles nearly always are healed after their exposure. I cannot say whether the scar formation after this operation is always so favorable that the function is improved or retained.

SIEBENMANN is of the same opinion as Stacke.

HARTMANN mentions the fact that he presented a case at the meeting in 1890, before Zaufal or Stacke had published their papers on the radical operation, where after retraction of the auricle the antrum was exposed up to Shrapnell's membrane, and the ossicles were then extracted. In the previous year Hartmann had formulated the plan of joining the antrum, attic, and ear canal.

JANSEN considers caries of the ossicles to be secondary, and of less importance than the fundamental disease of middle ear or mastoid antrum. Isolated disease of the attic is secondary. The perforation at the superior pole, which is supposed to be characteristic for malleus or incus caries, occurs frequently in healthy ossicles. If the hearing is good, it is usually made worse by the operation. The ossicles may be freely extracted when the long process of the incus is wanting; otherwise the drum and ossicles should be preserved if the hearing is good, in fact this is a duty if the hearing in the other ear is defective. If local treatment is unsuccessful, the radical operation with preservation of the ossicles, and not the extraction of the latter, is indicated. A reason for preferring the radical operation to Stacke's is the fact that in the first method the preservation of the ossicles is more assured. The danger of displacing the ossicles can be avoided when the conditions warrant, by leaving a small bony margin at the rim of the drum membrane. Unfortunately we are often compelled to remove perfectly sound ossicles when cholesteatoma is present between the incus and the labyrinth wall. After the radical operation with preservation of the ossicles fully exposed in the attic healing takes place, inasmuch as the lateral surfaces of the ossicles are covered by a thin layer of granulation tissue. The latter then becomes epidermized from the drum membrane, starting from the posterior and upper wall. This epidermized

granulation tissue then contracts, and a very thin membrane remains covering the ossicles, scarcely restricting their mobility.

SCHEIBE : We have performed the radical operation from the beginning by leaving the ossicles *in situ*. If the opening behind the ear is to be permanent, skin-grafting must be done.

LEUTERT emphasizes that in the cases under consideration the hammer or incus, or both, are frequently carious.

SIEBENMANN : It is very important in performing the radical operation to preserve, as much as possible, the functional activity of the ear ; hence the ossicles should be retained as often as possible. In many cases we should endeavor to produce a permanent defect behind the auricle.

STACKE : In regard to Jansen's remark on the greater danger of displacing the ossicles in my operation, I cannot see how the radical operation proceeding from the antrum offers better chances than in my method of entering above the drum after retraction of the auricle. The retraction of the auricle gives us so much space that any amount of bone can be removed without injuring the drum or the ossicles.

LUCAE : I agree with Stimmel that many cases of chronic otorrhœa heal without operation.

SCHEIBE draws attention to the value of the tympanic syringe ; if the fœtor does not disappear after its use the operation is indicated.

ZARNIKO : Recovery often takes place after careful cleansing and treatment. A number of cases cured by treatment are reported.

II. BRIEGER, Breslau. **The pathology of otitic meningitis.**

Otitic meningitis may present an unusually varied course. All the symptoms characteristic of inflammation of the soft brain membranes may be absent, and the symptoms of a general infection may preponderate. The process may extend abruptly and focal symptoms may appear (aphasia, motor disturbances), simulating a brain abscess. There are intermittent forms of purulent meningitis, which later, after a number of meningeal symptoms, may lead to death. Anatomically these are represented by circumscribed meningitides, which may heal if they remain localized, or finally become general and fatal. If the cause of these meningeal attacks, located in the primary otorrhœa, usually in the labyrinth, be eradicated, recovery may take place. On the other hand, the generalization may be favored by concussion from the

chisel, as has been shown in animals. These are apt to be taken for cases of serous meningitis. The diagnosis of this form of meningitis is very uncertain, and the value of a successful lumbar puncture is uncertain. Lumbar puncture has a favorable influence, objectively apparent, even on a purulent meningitis; while the disappearance of meningeal symptoms after a simple opening of the skull urges us to judge these proofs with caution. The author then discusses the diagnostic importance of lumbar puncture generally, and cites a case where an operation for brain abscess was not made, because from the lumbar puncture meningitis was diagnosed. At autopsy an abscess was found in the temporal lobe, with fistula into the ventricle (hence the condition of the cerebro-spinal fluid), while the meninges were macroscopically normal. The favorable effect of lumbar puncture in purulent meningitis, combined with eradication of the primary ear trouble, may be of value in treating meningitis.

Discussion: LEUTERT mentioned that the leucocytes in the fluid obtained by lumbar puncture were increased in number.

JANSEN: Kronig has also found a leucocytosis. We usually designate healed cases of meningitis as serous, while there is no question but that cases of the purulent type may recover. Lumbar puncture does not always solve the question. I have observed this affection in uncomplicated serous infection of the mastoid process, most frequently in labyrinthine suppuration.

12. LEUTERT, Königsberg. **The opening of the normal sigmoid sinus for diagnostic and therapeutic purposes.**

From the therapeutic success achieved by Hoeftmann by blood-letting from the normal sigmoid sinus in the presence of severe symptoms of increased intracranial pressure, the author recommends this procedure in those cases in which general increase of intracranial symptoms are suspicious of brain abscess, without the diagnosis being positive. In Hoeftmann's, and in two cases of his own, the pressure symptoms disappeared soon after the blood-letting had been done; he thought that in future, operations for brain abscess, where the only indication present is general increase of pressure, which is not rare, as in Kretschmann's and Joel's cases, and no abscess is subsequently found, can be avoided. Leutert describes a third case where the symptoms, especially amnesic aphasia, did not disappear after blood-letting and the diagnosis of brain abscess verified at autopsy was confirmed. This procedure is in order especially in those cases

where the mastoid is to be, or has already been, opened as is the custom with otologists. In opening the sinus due attention must be paid that the respiration remain regular so that the danger of air embolism, which however need not be fatal, may be avoided. Leutert regards the opening of the sinus as not dangerous.

This step is also of therapeutic value as headache tends to cease promptly. The cases where this procedure has been tried are not sufficient to establish its value, but it deserves further trial.

Discussion : JANSEN : We often see after operative intervention such severe symptoms as Leutert has described appear or continue without permitting an exact diagnosis. A large number finally recover under expectant treatment. I fear that Leutert's procedure may easily complicate the course of the disease. To open the sinus in an affected mastoid is surely not without danger, and the less experience we have with these difficult cases the more apt are we to practise methods so as not to neglect anything. Leutert's cases were furthermore complicated as the dura was also opened. It would be better to explore the sinus outside of the mastoid. I believe however that this procedure will meet with scant favor.

BRIEGER : On account of the pressure in the cerebral blood channels danger of air embolism in the normal sinus is not very great. Brieger mentions a case where air was aspirated and air embolism followed, which necessitated ligation of the jugular. Vague therapeutic effects should be practised with caution as so many cases of cerebral symptoms recover spontaneously.

SCHEIBE thinks that Leutert's procedure can be tested in cases of accidental opening of the sinus.

JOEL warns against opening the sinuses.

LEUTERT in conclusion said that although the dura had been opened in one case no cerebro-spinal fluid appeared. He does not regard opening of the sinus as dangerous, Kuhn's fatal case being the only one on record, while several deaths had resulted from lumbar puncture.

13. BRÜHL, Berlin. **Microscopic specimens of two cases of lateral sinus thrombosis in pyæmia.**

(1) Puriform softened thrombus, adjacent to the wall. Sinus wall infiltrated with pus. Purulent thrombo-phlebitis.

(2) Carious bone; adjacent sinus wall infiltrated with pus. Purulent thrombo-phlebitis.

14. DENKER, Hague. **Open-wound treatment after Thiersch's skin-grafting following radical exposure of the middle-ear cavities.** Denker has employed for three years a method of after-treatment by skingrafts which he believes to have advantages over the usual treatment. He noticed that the grafts at the external part of the wound quickly became attached to the depth of the drying influence of the air; he now leaves all grafts exposed to the air with a certain protection. Skin-grafting is only resorted to when the walls are presumably healthy and there are no carious spots; the most favorable time is between the second and fourth week after the mastoid operation. To protect against hemorrhage, the granulations are curetted several hours before, with cocaine anæsthesia, and the wound is packed with gauze. The grafts are taken from the thigh and measure 5-10 cm by 2-3 cm. If such a large graft is taken with one incision in a few seconds, narcosis is unnecessary. The graft is then cut in the proper pieces and adapted to the wound surface. The wound remains perfectly open except for a gauze strip at the bottom and in the lower angle. This piece of gauze soaks up the secretion and keeps the edges of the wound apart, which show a great tendency to unite, and allows free access of air. A protector of wire netting is placed over the ear. The dressing is changed daily, and the grafts are firmly attached in from four to twelve days. A special feature according to Denker is the simplified and shortened after-treatment. The ugly prominence of the auricle is avoided.

Discussion: KÜMMELL mentions the microscopic examination of transplanted pieces of skin by Henle, and suggests the immediate transplantation on fresh wounds.

SIEBENMANN is pleased that the value of transplantation on bone is being recognized. He usually makes two long grafts.

JANSEN: The best time to graft is either at time of operation or during the first dressing. The graft may be introduced on a specimen carrier.

SCHEIBE skingrafts directly on the granulation at the second dressing with good results. Denker's suggestions are valuable.

SCHMIDT transplants frequently, though he has never grafted on granulations, by reason of Thiersch's publications. He believes that small grafts are more favorable.

15. HARTMANN, Berlin. **On the radical operation.**

In performing the radical operation, the dilatation of the canal

and formation of a posterior flap is often difficult and tedious because the auricle and canal offer no resistance to the knife. Instead of the various contrivances, forceps, hooks, probes, etc., the author has devised an ear-canal forceps. One branch is straight and grooved like a director for the ear canal; the other branch is curved for the auricle and then straight and fenestrated to go outside the canal. The ends of the two branches grip the membranous canal. The wall is divided by a knife cutting through the fenestrated branch on the other one.

16. BRIEGER, Breslau. **Demonstration of microscopic specimens.**

(1) Specimens and drawings of an aural polyp which appeared through Schrapnell's membrane, and carried hairs. The hairs presumably grew into the perforations during an attic suppuration and had led to the formation of a granuloma with giant cells.

(2) Specimens of the so-called latent pharyngeal tonsillar tuberculosis. The tubercles contained peculiar products of a retrograde metamorphosis which appeared as degenerated elastic fibres with lime deposits.

(3) Stereoscopic photographs of pathological specimens made with the stereoscopic microscope of Zeiss-Greenough.

(4) Drawing of a tumor of the acoustic nerve.

17. BROICH, Hanover. **My method of direct vibratory massage of the Eustachian tube and its effect on the middle ear.**

After a short description of the methods of vibratory massage and an unfavorable criticism of the direct massage of the Eustachian tube with bougies, the author describes his own method, which is as follows: With the aid of special probes introduced by way of the nose a direct massage of the pharyngeal ostium and the commencement of the tubal canal is produced by Spoes's saw handle driven by an electro-magnet. The action of this method is analyzed on the laws of vibratory massage founded by Ostmann. The effect of massage is described on the normal and affected ear. The procedure can be followed by auscultation and, combined with the otoscopic image, made use of in a diagnostic, differential diagnostic, and therapeutic sense. In conclusion the rational indications are given for the use of this method alone or combined with the principal medications employed in the treatment of the chronic or subacute tubal or middle-ear catarrhs.

Discussion: THOST said that Urbantschitsch was the first to

directly massage the Eustachian tube. He also employs massage combined with the medicamentous treatment.

18. RUDLOFF, Wiesbaden. **The removal of adenoid vegetations with the over-hanging head in narcosis.**

The author has practised this method for eleven years where the danger of aspirating blood and tissue particles is avoided. Under full chloroform anæsthesia, the head is allowed to hang down, the operator's protected index finger is inserted in the left angle of the mouth, and the tongue is depressed by the assistant. The vegetations are removed with Boecker's and Hartmann's curettes.

In the presence of hypertrophied tonsils, it is better to precede with the tonsillotomy several days or weeks before. Enlarged tonsils are apt to make the breathing difficult, and may lead to asphyxia.

Rosenmüller's fossa should be entered with the curette (Hartmann's), care being taken to avoid the tubal ridge and the lateral wall. Injury to the latter structure from its relation to the sheath of the great vessels might harm the carotid.

Ten cases out of 254 required a second operation; an exact statistic of the remaining 366 was not possible.

The author operates both with anæsthesia and without. Anæsthesia is employed in excitable and timid children, and in the presence of certain anatomical peculiarities of the naso-pharynx, as when posterior wall and roof form an oblique bend and the atlas protrudes into the naso-pharynx.

Discussion: PLUDES also operates with dependent head in narcosis; he employs Beckmann's curette.

THOST has operated on 4000 cases in narcosis, but like Hopmann, Moritz Schmidt, with the head erect. He has never seen that blood or diseased particles were aspirated. He operates as soon as the corneal reflex is lost.

ENGELMANN always examines first by posterior rhinoscopy which is almost always possible in children over four years. Generally the operation can be done in a much more conservative manner than is usual. The location, and not the size of the adenoids is important. The vegetations may be large, but still not interfere with respiration. Respiration may often be made free by simply cleaning the nose of mucus. Even if the vegetations are large, a general and appropriate local treatment may cause a sufficient though slight shrinkage so that the children seem perfectly well.

SCHMIDT asks whether the vomiting after narcosis does not start up severe hemorrhage? He has operated on some cases for the second time, but has never been able to remove large pieces, and breathing was not improved.

STIMMEL is in favor of operating without anæsthesia; he uses Beckmann's curettes.

SIEBENMANN employs anæsthesia, but bromethyl instead of chloroform, which he regards less dangerous.

In conclusion, RUDLOFF says that the possibility of the aspiration of blood or tissue fragments cannot be excluded, hence he prefers to operate with dependent head. He objects to bromethyl because it is not free from danger, the anæsthesia is too short, general muscular relaxation does not always take place, and the after-effects are more disagreeable than those of chloroform.

REPORT ON THE SIXTH INTERNATIONAL OTO-
LOGICAL CONGRESS, HELD IN LONDON,
AUGUST 8-11, 1899.

BY DR. W. JOBSON HORNE, LONDON.¹

This is the Sixth Congress and the first that has been held in the British Isles. Of the previous congresses, the first was held in New York, in 1876, the second in Milan, in 1880, the third in Basle, in 1884, the fourth in Brussels, in 1888, and the last in Florence, in 1895. The congress was more largely attended than on any previous occasion; the number of adherents, exclusive of ladies, was upwards of two hundred and fifty. The Royal Colleges of Physicians and Surgeons of London kindly lent their examination hall on the Victoria Embankment, which afforded an excellent theatre for the reading and discussion of papers and also for lantern demonstrations, whilst the large rooms on the first floor lent themselves admirably for the accommodation of the unique museum.

On Tuesday morning, August 8th, the opening ceremony of the congress was held.

The proceedings commenced with an address by Professor Urban Pritchard on the growth of otological science (a verbatim report of the address is appended).

Professor Pritchard afterwards proposed a vote of thanks to the Royal Colleges of Physicians and Surgeons for having placed at the disposal of the Congress their examination hall. He further expressed his thanks to the Royal College of Surgeons for the loan to the museum of the congress of many of their valuable and interesting specimens relating to the ear and nose; he more particularly referred to those preparations by Professor Charles Stewart illustrating the comparative anatomy of the ear and nose.

¹ The report has been furnished by Dr. Horne, one of the secretaries of the Congress, to these ARCHIVES, the *Journ. of Lar., Rhin., and Otol.*, and other periodicals.—H. K.

Sir Wm. MacCormac, President of the Royal College of Surgeons, acknowledged the vote and congratulated Professor Pritchard upon his address and on the large numbers attracted in the cause of science. Sir Wm. MacCormac concluded by expressing the pleasure it had afforded the College of Surgeons to lend specimens from their collections to the museum of the congress.

The Secretary-General announced that letters expressing regret at inability to attend the opening ceremony had been received, amongst others, from the Prince of Wales, the Lord Mayor of London, and the President of the Royal College of Physicians. He further announced the attendance of delegates Professor Lucae and Dr. Arthur Hartmann of Berlin, from the German Otological Society; the attendance of Dr. Delavan, from New York; Dr. Allen T. Haight, from the Chicago Medical Society, and also from the Chicago Ophthalmological and Otological Society; and Dr. H. A. Goldstein, from the Western Ophthalmologic and Otolaryngologic Association.

Professor Grazi, of Florence, president at the last congress, delivered an address in which he expressed pleasure that the hopes which he had entertained of the next congress being held in London had been realized. He regretted that so long an interval had elapsed between the fourth and fifth congress and he hoped that it would not recur. He spoke of the congress in Milan and of the work of Voltolini, and referred to Sir Wm. Wilde and Toynbee who had brought otology out of the terra incognita, also to Trölsch who had contributed so much to otology in Germany and who regarded himself as a disciple of the two English pioneers. Finally he offered a vote of thanks to Professor Urban Pritchard and to the British Organization Committee for their successful efforts in promoting the present congress. He then proposed that the following telegram should be forwarded to Her Majesty the Queen.

"The Sixth International Otological Congress which opened in London this day begs, on the proposition of Professor Grazi, of Florence, to offer to Your Majesty its respectful congratulations on the completion of the 62d year of Your Majesty's prosperous reign. From Urban Pritchard, President, Cresswell Baber, Secretary-General."

A reply was subsequently received from Sir Arthur Briggs, in the following terms:

"The Queen desires me to convey to the Sixth International Congress the thanks of Her Majesty for the congratulatory message received yesterday."

On the motion of Professor Politzer, seconded by Professor Lucae, the following were elected officers of the congress :

Professor Urban Pritchard, President ; Mr. Cresswell Baber, Secretary-General ; Dr. Thomas Barr, of Glasgow, Dr. Benni, of Warsaw, Dr. Bobone, of St. Remo, Dr. Arthur Hartmann, of Berlin, and Dr. Lermoyez, of Paris, Secretaries ; and Mr. Cumberbatch, of London, Treasurer. The above to form the Editorial Committee for the *Transactions of the Congress*.

This completed the proceedings of the opening ceremony.

Proceedings, Tuesday, August 8th.

AFTERNOON SITTING.

The President occupied the chair. The following papers were read and discussed :

Dr. E. SCHMIEGELOW (Copenhagen), "A new method of measuring quantitative hearing-power by means of tuning-forks."

Professor G. GRADENIGO (Turin), "A scheme for the uniform notation of the results of the investigation of hearing-power"; "A new optic method of acoumetry."

Dr. RICHARD KAYSER (Breslau), "Experimental investigations on the hearing phenomena in fluid media."

Dr. O. BRIEGER (Breslau), "Tuberculosis of the middle ear."

Dr. W. MILLIGAN (Manchester), "Some observations upon the diagnosis and treatment of tuberculous disease of the middle ear and adjoining mastoid cells."

Dr. ARTHUR HARTMANN (Berlin), "Congenital and acquired anomalies of the external ear, with demonstration of specimens."

Dr. ROHRER (Zurich), "The appearance of varices on the ear drums."

Dr. BOBONE (St. Remo), "The early involution of adenoid growths on the Riviera."

Dr. ALLAN T. HAIGHT (Chicago), "Naso-pharyngeal adenoids as a causative factor in ear disease."

Proceedings, Wednesday, August 9th.

MORNING SITTING.

The President in the chair. A general discussion on the **indications for opening the mastoid in chronic suppurative otitis media** was opened by Prof. Politzer (Vienna), Prof.

Wm. Macewen (Glasgow), Dr. Luc (Paris), and Prof. Knapp (New York). Prof. Lucae (Berlin) read a paper on **the radical operation in chronic middle-ear suppuration**. The discussion was then thrown open and the following took part in it: Prof. Guye (Amsterdam), Dr. Moure (Bordeaux), Dr. McBride (Edinburgh), Dr. Jansen (Berlin), Prof. Gradenigo (Turin), Dr. Noyes (New York), Prof. Kümmel (Breslau), Prof. Eeman (Ghent), Dr. Brieger (Breslau), Dr. Barr (Glasgow), Prof. Faraci (Palermo), Dr. de Mendoza (Paris), Dr. Milligan (Manchester), Mr. Mark Hovell (London), Dr. Holmes (Cincinnati), Dr. Dench (New York), Mr. Cresswell Baber (Brighton), Dr. Holinger (Chicago), Mr. de Santi (London), Mr. Faulder White (Coventry), Dr. Lederman (New York), and the President. Professors Macewen and Knapp and Dr. Luc replied.

Proceedings, Wednesday, August 9th.

AFTERNOON SITTING.

Professor POLITZER presiding. Lantern demonstrations were given in the theatre by the following:

Dr. ARTHUR HARTMANN (Berlin), on the "Anatomy of the frontal sinuses and ethmoidal cells."

Dr. ALDREN TURNER (London), on the "Course and connections of the central auditory tract."

Mr. R. D. Joyce (Dublin), on the "Topography of the facial nerve in its relation to mastoid operations."

Dr. L. KATZ (Berlin) gave a demonstration in the museum of "Microscopic and macroscopic preparations of the organs of hearing," which were very much admired.

Papers were read by Dr. P. RUDLOFF (Wiesbaden), "The operation of the removal of adenoid growths with the head hanging over the table, while the patient is under the influence of chloroform"; Professor V. UCHERMANN (Christiania), "On rheumatic diseases of the ear."

Proceedings, Thursday, August 10th.

MORNING SITTING.

Prof. GRAZZI presiding.

The following papers were read:

Dr. E. MÉNIÈRE (Paris), "On the treatment of chronic suppuration of the attic." In the absence of Dr. Ménière this paper was read by Dr. Lermoyez (Paris).

Dr. MOURE (Bordeaux), "Some points in the technique of trephining the mastoid."

Dr. E. B. DENCH (New York), "The operative treatment of mastoid inflammation."

Dr. DELIE (Ypres), "Panotitis with cerebral complications; death; autopsy."

Mr. ARTHUR H. CHEATLE (London), "The petro-squamosal sinus, its anatomy and pathological importance." The paper was accompanied by lantern demonstrations.

Prof. GRAZZI (Florence), "New treatment for chronic catarrhal inflammation of the pharynx, especially in relation to diseases of the ear."

Dr. MALHERBE (Paris), "Surgical treatment of dry chronic inflammation of the middle ear, by scooping out the petro-mastoid bone with and without intubation."

Prof. AVOLEDO (Milan), "Two cases of facial complication resulting from extension of inflammation from acute suppurative disease of the external and middle ear."

Dr. LOUIS BAR (Nice), "Diagnosis of abscess in the interior of the mastoid and of furunculosis of the external auditory meatus."

Dr. COSTINIU (Bucharest), "The result of acoustic exercises on deaf-mutes."

Proceedings, Friday, August 11th.

MORNING SITTING.

Professors LUCAS and KNAPP presiding.

The following papers were read:

Dr. GOLDSTEIN (St. Louis), "Therapy of the tympanic mucous membrane."

Prof. EEMAN (Ghent), "Sclerosis of middle ear."

Dr. P. LACROIX (Paris), "The aural complications in ozæna."

Prof. POLITZER (Vienna), "On the extraction of the stapes with demonstration of histological specimens."

Prof. OSTMANN (Marburg), "On the curability of hitherto incurable deafness by means of vibratory massage of the conducting apparatus."

Prof. FARACI (Palermo), "The acoustic and functional importance of mobilization of the stapes."

Dr. G. NUOLI (Rome), "The pneumatic treatment of diseases of the ear."

Dr. FR. FISCHENICH (Wiesbaden), "The treatment of catarrhal adhesions in the middle ear by intra-tympanic injections of pilocarpine."

Dr. S. F. SNOW (Syracuse, N. Y.), "Twentieth-century prognosis in chronic catarrhal deafness."

Dr MINK (Zwolle), "Pneumo-massage of the tympanum under high degrees of pressure."

Dr. GARNAULT (Paris), "Mobilization (three years ago) of the stapes, in a man of seventy-two years of age, deaf for forty years, absolutely so for fifteen, with great and permanent improvement in hearing."

Dr. RUTTEN (Namur) showed an "exostosis of the middle ear."

CLOSING MEETING.

Friday Afternoon, August 11th

The President occupied the chair and expressed his pleasure that an invitation had been received from France and that the next meeting would be held in the city of Bordeaux. The following were elected to form the new International Organization Committee, with Dr. MOURE, of Bordeaux, as President-elect:

America: Drs. CLARENCE BLAKE, and ORNE GREENE (Boston), DENCH, ST. JOHN ROOSA, and KNAPP (New York), GOLDSTEIN (St. Louis), BRYAN (Washington), RANDALL (Philadelphia), HOLMES (Cincinnati), PIERCE (Chicago), DALY (Pittsburg), BARKAN (San Francisco), and ROALDÈS (New Orleans).

Austria-Hungary: POLITZER and POLLAK (Vienna), MURPURGO (Triest), HABERMANN (Graz), BOKE and SZENES (Buda Pest), and ZAUFAL (Prague).

Belgium: DELSTANCHE, CAPART, HUGET, GORIS, and COOSEMANS (Brussels), DELIE (Ypres), SCHIFFERS (Liège), and EEMAN (Ghent).

Denmark: SCHMIEGELOW and HOLGER MYGIND (Copenhagen).

France: CHATELLIER, DE LA CHARRIÈRE, GELLÉ, MÉNIÈRE, BARATOUX, LUC, CASTEX, LERMOYEZ, LUBET-BARBON, LOEWENBERG, and GOUGUENHEIM (Paris), MOURE (Bordeaux), NOQUET (Lille), and LANNOIS (Lyons), (with power to add to the number).

Germany: STACKE (Erfurt), PASSOW (Heidelberg), KÖRNER (Rostock), RÖPKE (Solingen), KIRCHNER (Würzburg), BRIEGER

and KÜMMEL (Breslau), LUCAE, HARTMANN, and JANSEN (Berlin), and BEZOLD (Munich).

Holland: GUYE, ZWAARDEMAKER, and POSTHUMOUS MEYJES (Amsterdam), MOLL (Arnheim), and VAN ANROOIJ (Rotterdam).

Italy: GRAZZI (Florence), AVOLEDO (Milan), BOBONE (San Remo), BRUNETTI and PUTELLI (Venice), SECCHI (Bologna), FARACI (Palermo), CHINCINI, DE ROSSI, and FERRERI (Rome), COZZOLINO (Naples), GRADENIGO (Turin), MASINI and POLI (Genoa).

Russia and Poland: BENNI and HEIMANN (Warsaw), ORLOFF (Kief), PIETKOWSKI (Lublin), STEPANOFF, VON STEIN, and SCOTT (Moscow).

Spain: SUNE-Y-MOLIST, BOTEY, and VERDÓS (Barcelona), SOTÀ-Y-LASBIA (Seville), GONZALEZ ALVAREZ, and URUNELA (Madrid), MORESCO (Cadiz), and CASANOVA (Valencia).

Norway and Sweden: UCHERMANN and HORBYE (Christiania), CETERBLAD and LAGERLOF (Stockholm).

Switzerland: SECRETAN (Lausanne), ROHRER (Zurich), and SCHWENDT and SIEBENMANN (Basle).

British Empire: ARTHUR H. CHEATLE, CUMBERBATCH, DALBY, FIELD, DUNDAS GRANT, HILL, JOBSON HORNE, MACNAUGHTON JONES, LAW, URBAN PRITCHARD, and ST. CLAIR THOMSON (London), CRESSWELL BABER (Brighton), MILLIGAN (Manchester), BRONNER (Bradford), PATERSON (Cardiff), STONE (Liverpool), MCBRIDE (Edinburgh), BARR (Glasgow), SANDFORD (Cork), FITZGERALD (Dublin), BARRETT (Melbourne), and BIRKETT (Montreal).

The Chairman next announced that the jury appointed to consider the applications for the Lenal prize, founded by Baron Lenal,—to be awarded to the author of the most marked progress bearing on the practical treatment of affections of hearing since the last congress, or to the inventor of any new apparatus readily portable, which improved considerably the hearing-power of deaf persons,—had awarded the prize to Dr. CHARLES DELSTANCHE, of Brussels, for his instruments for treating the middle ear. Upon the suggestion of Professor Grazzi, of Florence, a telegram was sent to Dr. Delstanche, acquainting him with the jury's award.

The President then delivered his closing address. He thought that too much was made of the President; he was but one of the many stones which together built up the congress. He

referred to the excellent work done by the Organization Committee, and more particularly to that done by the secretary-general, and the chairmen and secretaries to the various sub-committees and by the honorable treasurer, Mr. Cumberbatch. He also tendered his thanks to Mr. George Field for his hospitality. Lastly, he spoke of the work which had been done by the Museum Committee. When the suggestion, he said, was first made that a museum should be held in connection with the congress he was delighted, and still more so when Mr. Ballance kindly undertook the chairmanship, putting into the work all his enthusiasm. They had all worked with a will, and no two more so than Mr. Arthur Cheatle and Dr. Jobson Horne. The museum grew and grew, and the results which had so pleased them all had been worth the labor. After the museum had been dispersed, he said, and even after another museum of the kind had been formed, the catalogue would be a work of reference, useful to all otologists. He concluded by expressing his indebtedness to all the members of the congress who really formed the foundation layer of its success.

A hearty vote of thanks to the President, proposed by Professor GRAZZI, was carried by acclamation.

Dr. BENNI, of Warsaw, in the name of the foreign members, proposed a vote of thanks to the Organization Committee, to which Mr. Cresswell Baber replied and expressed the hope that the results of their work would be an encouragement for the future study of otology.

Professor POLITZER, speaking in English, said : " Mr. President and Gentlemen,—In every congress there is always one outstanding feature which remains in our memory forever ; it will, I think, be allowed by every one here present that the outstanding feature of this congress has been the museum. I have attended every otological congress up to the present, and also seen every important museum in the world, and I do not hesitate to say that I have never before seen such a magnificent and well-organized museum, and I doubt if it will be possible to see such a one again. This result is due to the exertions of Mr. Cheatle, ably assisted by Dr. Jobson Horne. Those of us who have had to arrange specimens in the museum will join with me in giving unlimited praise to these two gentlemen for the never failing urbanity, their suavity of temper, and their amiable behavior in the midst of very trying circumstances. I take upon

myself to express to these gentlemen the thanks of the congress for their incessant and indefatigable labors which have so materially helped to render this congress such a great success."

Mr. CHEATLE thanked Professor Politzer for his kind expressions, and after a few farewell words from the President, the Sixth International Congress was brought to a close.

PRESIDENT'S ADDRESS,

"THE GROWTH OF OTOLOGICAL SCIENCE," delivered Tuesday morning, August 8th.

By the President, URBAN PRITCHARD, M.D. Edin., F.R.C.S. Eng.,
Professor of Aural Surgery in King's College, London.

In the name of the British Organization Committee, and in the name, indeed, of all British otologists, I wish to offer a very hearty welcome to our foreign colleagues and to their ladies.

We thank you most sincerely for coming here, in many cases, hundreds—nay, even, I may say, thousands—of miles, in order to assist at this, the Sixth International Otological Congress, and I trust that your visit to London will be a very pleasant one; at any rate, I may certainly promise that we will do all in our power to make it so.

There is, however, one serious difficulty which, with all the good-will in the world, cannot be removed. I refer to the fact that, owing to the immense size of this London of ours, so much loss of time is entailed in getting from place to place. When I remember how conveniently we were located during the pleasant gatherings of congress at Basle, at Brussels, and at Florence, and the ease with which we were enabled to find our way about, I cannot help regretting that our vast metropolis cannot be, for the moment, brought within more manageable compass; but as that is impossible, we must content ourselves with doing the best we can under the circumstances.

In bidding you welcome I have used the word "foreign" to our guests; but I do not like that designation in connection with our congress. For *Science* acknowledges no differences of nationality; she is, herself, all in all, and faithfulness to her the sole condition of citizenship in her kingdom.

Therefore let us regard ourselves, not as under our national

flags, but as assembled in common brotherhood, marching together under the banner of Otology, and forming one part of that army commanded by Science which is engaged in overthrowing the foes of humanity, those foes which have Ignorance, Vice, and Prejudice for their leaders.

Personally, I feel a thrill of pleasure in seeing so many valued friends assembled again for conference ; and of these may I be permitted to mention the names of Professor Politzer, Professor Guye, Professor Lucae, Dr. Arthur Hartmann, Professor Knapp, Dr. Ménière, and our last President, Professor Grazzi.

But it is a real grief to miss some old familiar faces. The genial President at Basle, Burkhardt-Merian, dear old Sapolini of Milan, Moos of Heidelberg, and Delstanche (père) of Brussels, these are honored names which will long be remembered in the annals of otology, though they themselves have passed "behind the veil."

Again, since our meeting in Florence, our branch of medical science has lost another faithful servant. I allude to Dr. Meyer of Copenhagen, whose name in connection with the discovery of post-nasal adenoids is so justly renowned. Lastly, among other names that must occur to each one of us, I will only refer to those of Professor Colladon of Geneva and Hewetson of Leeds, who were both to have taken an active part in our proceedings this week.

We deeply regret also to note the absence, from unavoidable circumstances, of several friends whom we should so gladly have welcomed among us to-day ; and I am especially grieved that ill-health has prevented Dr. Charles Delstanche, our hospitable President at Brussels, from being at his accustomed place on this occasion,—I believe that it is the first time that our Otological Congress has not had the support of his energetic and cheery presence.

Now, friends, it seems to me that at the opening of our congress it is well that we should recall briefly the story of the birth and growth of otological science, and with your permission I will say a few words on this subject now, dwelling more particularly on the advances made in it during the last thirty years.

Although **Toynbee** is generally acknowledged to be the father of modern otology, for the date of its birth we must go back some 3400 years to the then flourishing country of Egypt. For Professor Roosa, in his excellent treatise, refers to a certain ancient papyrus

(called, after its discoverer, the Papyrus Ebers) on which is written a monograph on "Medicines for ears hard of hearing" and "for ears from which there is a putrid discharge." And here, in our museum, may be seen a confirmation of the fact that ear troubles not only existed in those days, but that they could be cured; for we have the good fortune to possess a curious old Egyptian relic, consisting of a wooden tablet on which is portrayed, in bas-relief, two effigies of the Sacred Bull, and two Auricles. This was undoubtedly a votive offering to the god Hathor from some "grateful patient."

In spite of its early birth, however, otology, except perhaps with regard to its anatomy and physiology, did not make itself of great importance until the second half of the present century. It is true that here and there a surgeon might have been found who had turned his attention, to some extent, to this subject; and, indeed, our own Royal Ear Hospital in Dean Street, Soho, which is acknowledged to have been the first successful aural clinique in Europe,—and I believe in the world,—was established in 1816. But, speaking generally, we may safely assert that aural surgery continued to be more or less in the stage of infancy until between 1840 and 1860, when the study was vigorously taken up by Sir William Wilde and Toynbee, who thus gave a fresh impetus to the study of the pathology and treatment of diseases of the ear. Even then its importance was by no means generally recognized; indeed, only thirty years ago it was a favorite saying of more than one celebrated surgeon, that "ear diseases may be divided into two classes: those which can be cured by any general practitioner, and those which, being incurable, may be relegated to the tender mercies of the ear specialists."

Is it any wonder, therefore, that in those days aural surgery was not only considered to be, but actually was very much mixed up with the name of quackery; for, as scientific men refused to have anything to do with it, the door was left open for any charlatan to enter, and many strange stories gained credence as to methods of treatment which the patient was required to undergo. Indeed, one of my earliest boyish recollections of aural surgery was hearing the story of how a child, a deaf-mute, had been cured by a skewer having been passed through his head from one ear to the other. Although a somewhat better knowledge of anatomy has since made me doubt the accuracy of this statement, still it is certain that strange things were both said and done in the

olden times, which did not redound greatly to the honor of the specialist.

In my own student days I well remember the sarcastic manner of Professor Partridge—Dicky, as we used to call him at King's College—when he said, "Ah, gentlemen, a little wax is a godsend to an aurist"; meaning, of course, that its removal was an easy method of earning a reputation. And, no doubt, there is a certain truth in these words, though not exactly in the sense implied by the good old Professor; for which of us has not found that, by removing a plug of serum which has either not been diagnosed or which has resisted all the efforts of the general practitioner to dislodge, we have gained kudos and an appreciation which many of our more delicate operations have failed to secure.

Yes, otology had indeed a hard battle to fight before it could be said to have won honorable recognition among men of standing in the medical profession; and I shall never forget the letter which one of these wrote to me in 1872, when he first learnt that I intended to devote myself to this branch of study. After lamenting my decision, however, he did conclude by saying: "Now I suppose that I must not regard all aural surgeons as quacks." And may I add, as a kind of commentary on this letter, that within a few years afterwards the writer of it came to me as a patient.

Things have indeed changed since then, for, instead of a few aural surgeons scattered here and there in Great Britain, we have now at least a couple of hundred; while the number of clinics in London alone has been increased from two to three, to near upon twenty. And in many other countries this branch of medical science is even more strongly represented.

As a natural result of the increased interest in the work, let me call attention to the unique museum connected with this congress, wherein is to be found the largest and most valuable collection of otological specimens, a collection which could only have been brought together by the union of our international forces. The museum is so complete that if you had come to visit that alone your trouble would have been repaid.

But in one respect there is still room for improvement. I refer to the need for the better recognition of otology by our universities and colleges. I am glad, however, to be able to report that one step has lately been made in this direction, for the University of Edinburgh has now made it one of the qualifying subjects for

her medical degrees, and I look forward, with hope, to the time when her example will have been generally followed.

This "new departure" will, I trust, lead to a fuller recognition of the position of teachers of aural surgery. In this respect we, in the British Isles, are sadly behind other countries, where chairs of otology are numerous; whereas here, among all our universities and colleges—where so many able lecturers are to be found—in King's College, London, alone, is the dignity of a professorship conferred upon its teacher of aural surgery.

Let me now pass in brief review the progress of the last thirty years.

So far as the **anatomy** and **physiology** of the auditory apparatus are concerned, comparatively little has been added to the store of knowledge already gained, although a more intimate study of its parts has made that knowledge more complete and precise.

In **pathology**, as might be expected, there has been considerable advance.

In disease of the meatus, although aspergillus was discovered before this period by Meyer, Schwartze, and Wreden, yet it was not elaborated with any fulness until later. Also, the nature and classification of exostoses have been worked out within this period.

Our knowledge of the changes in chronic middle-ear catarrh, and in sclerosis, has considerably advanced, although much here yet remains to be done.

The effect of pathological conditions of the nose and nasopharynx upon the auditory apparatus, adenoid vegetations more especially, has practically been discovered. The world has yet to learn what it owes to Wilhelm Meyer.

In chronic suppurative catarrh, disease of the ossicles, the implication of the attic, the antrum, and the mastoid cells have been worked out; also the intracranial complications which sometimes follow. The nature of the granulations and polypi are now better understood; and although Toynbee had already called our attention to cholesteatoma, its pathological importance in connection with mastoid disease was not fully realized until quite lately.

In the pathology of labyrinthine disease there has not, perhaps, been so much advance; but Ménière's disease is now better understood; and Politzer has made known to us a disease of the

bony capsule. Finally, the pathology of congenital syphilis affecting the internal ear has been partially worked out.

Our **means of diagnosis** have been considerably improved.

The diagnosis between affections of the conducting apparatus and the auditory nerve, which formerly was often confused, is now much more easily made out ; this is chiefly due to the study of the tuning-fork.

Methods of illumination have very greatly improved, to the immense advantage of the surgeon.

Bacteriology, again, has done much, and, in all probability, will do even more in the future, to help us in our diagnosis. Unfortunately, the essential apparatus is enclosed in such dense bone that the Röntgen rays have been of but little assistance.

In **treatment** there have been immense strides.

Even in chronic middle-ear catarrh and in sclerosis, those diseases which hitherto have baffled our most strenuous efforts, a distinct advance has been made indirectly, especially in prophylaxis, by treatment of the nose and naso-pharynx.

In suppurative disease there has been very great improvement in treatment. By means of boric acid, alcohol, and other suitable antiseptics, simple otorrhœa has become much more manageable ; and a far larger proportion of such cases are now healed, even without operation.

In the case of its complications,—caries, granulations, and polypi,—the advance made is most striking, and, in consequence, the large protruding polypus is now rarely seen ; and no aural surgeon at the present time would be able to show so large a collection of those as Dr. Warden, of Birmingham, was in the habit of displaying some twenty-five to thirty years ago.

Curettage of carious spots, and the removal of ossicles, so important in the treatment of many cases, has only recently been introduced.

✓ This brings us to the wonderful stride made in the treatment of antrum and mastoid disease, for which we have chiefly to thank Professors Schwartze and Stacke, although many others have contributed to the advancement. How much agony has been relieved, how many lives have been saved, by these operations !

And, gentlemen, this advance of surgery has carried us still farther ; for, by the joining hands of general surgery and otology, intercranial suppuration has been robbed of many of its victims.

But how, and why, is this ? How is it that, formerly, our

surgeons were unable to cope with these intercranial conditions? How is it that, now, we are able to operate on the tympanum, attic, and mastoid, practically with impunity?

Gentlemen, this is due to the adoption of **antiseptic surgery**. May I beg your indulgence for proudly claiming to be pupil, colleague, and brother professor of him whom I regard as the greatest man living to-day,—Lord Lister? Were it not that you would exclaim at my inconsistency, I should be tempted to add "compatriot" also. But yes, gentlemen, I will add the word. Not, however, in the sense in which I was just about to use it, that of English nationality; but with reference to that ideal country to which I alluded at the beginning of my speech, and of which we otologists are all the naturalized subjects. Here, on the common ground of our chosen land, the land of Science, we may all proudly claim Lord Lister as our compatriot, all rejoice to serve under such a leader in the battle against disease and death. The world does not as yet understand the full benefits which he has conferred upon mankind, but we, naturally, being his compatriots, have a better opportunity for doing so; and I can only add my earnest conviction that it is by faithfully following the counsels of our superior officers that our advancing column can best secure future victories.

Such, ladies and gentlemen, is the brief, and therefore necessarily inadequate, record of the progress of otology which I desired to lay before you.

We have seen that this nineteenth century, which has brought to the world so many wonderful blessings in other directions, has not been unmindful of our branch of medical science. For, whereas at the commencement of the century the ear was regarded almost as a terra incognita, scarcely worth consideration except as the seat of one affection only,—that which was generally known as "a deafness,"—now at its close, this organ is fully explored ground, and has been proved well worth exploration. Otology has been raised from the rank of pseudo-quackery to an honorable position in scientific surgery, and its importance and bearing upon the body as a whole are now fully recognized.

But while we rejoice in the progress made in the past, we must remember that much still remains to be done. For instance, we have yet to clear away that opprobrium of aural surgery, namely, the chronic non-suppurative disease of the middle ear. Shall we, in the near future, be enabled to cope successfully with this

hitherto invincible foe? Judging from the advance made in other directions, I am bold enough and sanguine enough to think that we shall; and, assuredly, when that help comes we shall all unite in blessing its victor.

Now it is the province of our otological congresses to take this and similar problems into consideration. But the real value of these gatherings is not to be measured merely by papers and discussions. This is one of their uses, it is true, for interchange of ideas is always good; still, the chief value of thus meeting together with others who are all interested in one common subject, is the kindling of enthusiasm which is thus engendered,—an enthusiasm which should serve to stimulate older and younger members alike to renewed efforts in the paths both of research and of practical treatment; and therefore, in conclusion, I desire most heartily to wish that this, our Sixth Congress, may be successful in all these directions.

Tuesday, Aug. 8th.

AFTERNOON SESSION.

The following papers were read:

Dr. SCHMIEGELOW (Copenhagen) read a paper on **a new method of measuring the quantitative hearing-power by means of tuning-forks.**

Many experiments, he said, had been made in later years to find a reliable method. There were the methods of Hartmann, Gradenigo, and Zwaardemaker, which, however, could not be called satisfactory, as they did not give exact results. In order to use the time and vibration of certain tuning-forks in measuring the hearing-power, it was necessary to know the vibration curve. If it were possible to measure the amplitude of each tuning-fork from the moment it was set in vibration to the moment when the tone died away, the difficulty in using forks as reliable tests of quantitative hearing would be solved. In the light of our present knowledge the amplitudes of the deeper forks only were measurable. Bezold and Edelmann had, by means of a very cleverly invented instrument, constructed vibration curves of the deeper forks (from D' to F), and from these they constructed a standard curve. They furthermore presumed that this curve, being almost the same in all the deeper forks, must be the same for every fork, even the highest ones. It seemed, however, said Dr. Schmiegelow, that Bezold and Edelmann had started from wrong conclusions, and that the result of their experiments did not agree with theory.

According to theory, the amplitudes decreased in an approximately geometrical progression; that is to say, the logarithms of the amplitudes diminished directly with the time. This theory was no doubt correct, but only as far as the small amplitudes were concerned (Jacobson), or, in other words, the logarithmical decrement was greater and irregular at the beginning, but towards the end it became nearly constant. By a very carefully drawn mathematical diagram, Dr. Schmiegelow showed that in an examination of the curve found by Bezold and Edelmann it would be seen that the differences between the logarithms of the amplitudes corresponding to the time of 0-10-20, etc., 100 seconds to begin with, decreased as they ought to do, but afterwards increased, which they ought not to do. According to theory, they should expect that the difference, after decreasing as it did to 0.151, ought to remain pretty nearly constant. The difference, however, increased again, which meant that for some reason or other the vibrations were impeded at an increasing rate, and the curve therefore not correct. Everything tended to prove that the curve of the higher fork was different from that of the deeper ones, and that such fork had its own special curve. In order to find the curve of vibration for each tuning-fork G. Forchhammer and I proposed the following method: A tuning-fork is struck, and the time during which it is heard at different distances from the ear is determined. The abscisses of the curve represent the distances, the ordinates the time of perception. The correctness of this method, said Dr. Schmiegelow, was founded on the fact that the amplitude was proportional to the distance at which the tone disappeared, the intensity of the tone being constant when the "Hörschwelle" was reached of the moment at which the tune ceased to be heard. The method was also practicable, in so far that instead of the microscopic amplitudes the macroscopic distances were measured, an advantage which was all the greater because the amplitude of the higher tuning-forks could not be measured microscopically. The forks examined were made by Edelmann in Munich, and were C G, c g, c' g', c² g², c³ g³, all of them unloaded.

The experiments were made under as good conditions as could possibly be procured in the open air at some distance from town. If, for instance, they were going to find the curve of the c' fork (261 vibrations), they would proceed in the following way: By six series of experiments they found that c' properly struck would

be normally heard for 7 seconds at a distance of 160 *cm.* from the ear, 14 seconds at a distance of 80 *cm.*, 23 seconds at 40 *cm.*, 37 seconds at 20 *cm.*, 62 seconds at 10 *cm.*, 88 seconds at 5 *cm.*, and 117 seconds when held as close to the ear as possible without touching it. According to the theory, the differences between the time at a distance of 5-10 *cm.* and the distances 10-20 *cm.* should be the same, because close to the ear, where they had to do with small amplitudes, the time increased at an arithmetical ratio (with constant differences) if the distance diminished at a geometrical ratio. This theory was actually proved by the experiments. At the beginning of the curve (from 160-20 *cm.* distance) they found that the differences in time were smaller at the greater distances from the ear, that they increased up to about 20 *cm.* distance, and then became constant as far as the final part of the curve was concerned. The fact was that a tuning-fork did not emit the tone from the external surface of the prongs, but the vibrations were presumed to spread out from two points which were situated between the external surfaces of the prongs. By a series of experiments they had found that the distance between the tone centre and external surface of the tuning-fork was about 1 *cm.* in the forks C G, c g, c' g', and c'', whilst the distance was about 1.5 *cm.* in the forks g² c³ g³ c' g' c'. As the distances were reckoned from that surface of the prong which faced the ear, they must therefore add to the distance 5-10 and 20 *cm.*, the distance of the tone centre from the external surface of the tuning-fork. With regard to the fork c' the addition would be 1 *cm.*

They were now able by means of calculated value of *x* and other experimentally found data to construct the curve for c'.

If a patient heard the fork c', for instance, 7 seconds, the fork being struck powerfully and held close to the ear, it meant that the patient's minimum hearing-amplitude, or his "Hörschwelle" (threshold of audition), was $\frac{160}{1.3} = 123$ times the normal for the distance. His hearing-power $\frac{1}{(123)^2} = \frac{1}{15129}$ of $\frac{1}{123}$ times. If the normal hearing-power is equal to 1, the reduced hearing-power would be equal to 0.00007. Supposing, on the contrary, the patient heard the fork 62 seconds, his minimum hearing-amplitude would be $\frac{11}{1.3} = 8.5$ times the normal for the distance. His hearing-power $\frac{1}{(8.5)^2} = \frac{1}{72.25}$ times 1 normal $\frac{1}{8.5}$ times the normal, and = 0.0138 if the normal hearing-power was equal to 1.

In this way they were able to construct the curve of every tuning-fork, and thereby to find how much the hearing-power was diminished, if they only knew the time for which the fork was heard at a certain distance from the ear.

By comparing the curves of the different forks, they now saw how greatly they differed. Some of them—the deeper forks—were steep and short; others—the higher forks—were flattened and long. In other words, the assumption of Bezold and Edelmann, that the curves were always the same, was not correct, and one employing their method could not get at reliable results. This could easily be illustrated by some examples. For instance, the forks c - g^1 - c^2 - g^3 - c^4 . They were, according to his experiments, normally heard close to the ear during 328, 202, 162, 55, and 43 seconds, respectively. Suppose they had a patient who heard these forks only for half the time, the normal hearing-power would, according to Bezold and Edelmann, for all tuning-forks be equal to $0.049 = \frac{1}{20}$. If, on the contrary, they used the special curve of each fork, the result would be quite different, because they found that the decrease of the hearing-power for c would be equal to $0.026 = \frac{1}{39}$ of the normal hearing; g^1 , $0.012 = \frac{1}{144}$ of the normal hearing; g^3 , $0.00006 = \frac{1}{17384}$ of the normal hearing; and c^4 , $0.000025 = \frac{1}{40000}$ of the normal hearing.

The enormous difference between the results given by this and by Bezold-Edelmann's method was obvious. He therefore believed that if one wished to use the time in which a fork was heard to measure the quantitative hearing-power, it would first of all be necessary to know the curve of the forks employed. In order to find these curves, he hoped the method he had given would be useful.

Dr. SCHMIEGELOW, replying to questions by Professor POLITZER and Dr. DUNDAS GRANT, said the experiments he had carried out were in connection with the mathematical aspect of the hearing-power. In the clinical work they had used the very good and practical methods of Dr. Hartmann, but he thought they were far from reliable. If they wanted to compare the result of the hearing-power by the different tuning-forks, and to know the influence on the voice, they could not get any certain basis to work upon. He was only as yet on the fringe of the question.

Professor GIUSEPPE GRADENIGO (Turin) read a paper on a **scheme for the uniform notation of the results of investigation of hearing-power.**

The methods which he proposes have been already for some time used with good practical effects in the Clinic and in the Polyclinic at Turin. The language employed is Latin. The various experiments are indicated by the initial letters of the authors' names who have described them. Here is the scheme :

AD
S (18") W R (+ 16"), H, Hm, Ht, P, v, V,
AS
AD
C c c¹ c² c³ c⁴ c⁵.
AS

Explanation.

AD, AS = Auris dextra, auris sinistra.

S = *Schwabach's* experiment (c = 128 vibr.). Duration of normal perception with own tuning-fork c = 18".

W = *Weber's* experiment (c). An arrow designates the side towards which the lateralization takes place.

R = *Rinne's* experiment (C). Normal perception with own tuning-fork C = + 16.

H, Hm, Ht = *Horologium*, watch per æer, ad mastoidem, ad tempora.

P = *Politzer's* acoumeter.

v = vox aphona, whispering voice ; V = vox communis, conversational voice.

The results of the measuring of the hearing-power for the various tuning-forks are expressed in hundredths of the normal duration of perception.

The following example will better demonstrate the method :

S (18) + 6 W		AD—S	prope	+	+	> 5	0.30—0.15	> 5
		R (+ 16)	H	Hm	Ht	P	v	V
		AS—15"	05	+	+	> 5	2.00—1.00	< 5
AD	12	42	72	95	100	95	100	
	C	c	c ¹	c ²	c ³	c ⁴	c ⁵	
AS	50	80	87	95	100	100	100.	

Professor GIUSEPPE GRADENIGO read a paper on a **new optic method of acoumetry.**

If we paint at the end of one of the branches of a tuning-fork which vibrates with sufficient amplitude a distinct figure (say a tall triangle), this figure will appear more or less doubled. The two images will overlap, the overlapping part being very distinct in outline and color (*field of double image*), while the separate

portions will be much paler and less distinct in outline (*field of single image*). As the vibrations diminish in amplitude the "field of double image" becomes greater—the two images gradually merging into one. The growth of the field of double image corresponds to the diminution of the amplitude of the vibrations of which it thus becomes a measure.

When we choose a figure in the form of an inverted V (Λ), black upon white ground, and if we mark it transversely with lines or steps forming various segments (*models and photographs shown*), we can in this manner obtain an exact index of the amplitudes of vibration at any instant of the tuning-fork's decrement. Since the amplitude of vibration is directly proportionate to intensity of the sound, we have thus an excellent clinical method of acoustometry. Professor Gradenigo expressed his thanks to Dr. G. Ostino, Professor C. Reymond, Dr. C. Gaudenzi, and Dr. O. Pes for their valuable help in these researches.

The best results are obtained with forks whose branches make wide excursions (up to 60 vibrations a second); but the method can also be used with forks up to 250 vibrations.

As the examination with low notes is of great value in the study of the affections of the sound-conducting apparatus, the method is very useful in spite of this limitation.

Of the facts which he had been able to elicit, he wished only here to refer to the two following ones:

1. In the vibration period measured with the said method, the decrement of amplitude goes according to the geometrical progression in proportion to the time.

2. The individual mistakes in the appreciation of the duration of the sound-perception in persons not accustomed to this kind of researches—that is, in most of our patients—are much greater than one would believe without such a direct objective control.

Dr. R. KAYSER read a paper on **experimental investigations of acoustic phenomena in fluid media.**

The final sound-vibrations, Dr. Kayser said, which determine hearing, take place in the cochlea, and therefore in a fluid medium. It has hitherto been impossible to investigate the conduct of vibrating bodies in fluids, because there has been no means of recognizing with any ease the vibrations of a body in water. He said he had, however, found a method of overcoming the difficulty. It consists in the use of a telephone, which is so modified that the plate of metal is surrounded on all sides by liquid. (Dr.

Kayser then gave a description of this water-telephone.) By means of this method it has been easy to prove that spoken sounds, or the sound of a tuning-fork in front of the plate, throw the metallic plate into feebler vibrations than when there is no water present. Low tuning-forks from C' downwards, and high ones from c' upwards, are not heard at all. If we imitate the conditions in the ear, with two openings closed by means of membranes (*fenestra ovalis* and *fenestra rotunda*), and put one of these openings in communication (by means of a *columella*) with a membrane corresponding to the *membrana tympani*, the following takes place : If the second opening is closed by means of any unyielding mass so that a distension of the fluid outwards is prevented, then the production of a sound in the telephone is no weaker than when similar distension of the fluid is present. It thus appears to result from this experimental proof that the molecular vibrations of the auditory ossicles have a greater significance than they were credited with according to the theory of Helmholtz, at present held. Further, it is proved by means of the water-telephone that the diminution of the intensity of vibrations is increased in proportion to the bulk of liquid which lies upon the metal plate, and the degree of its viscosity. In glycerine or milk the diminution of the intensity of the vibrations is markedly greater than in water.

Professor LUCAE said : It is not surprising that the sound should get weaker whenever you put a sounding tuning-fork into the water ; it is new, however, that certain sounds, the higher and lower ones, should get lost. If you put a sounding tuning-fork into the water, the sound gets lower up to the extent of an octave. Whether the human voice gets so much lower too is the next question. Because the sound gets so much lower by the pressure of the water, it does not necessarily imply this.

Dr. KAYSER, closing the discussion, said : It is a well-known fact that the pitch of a tuning-fork diminishes under water, but I do not know whether it is as much as an octave. However, with the telephone under water this could be easily proved. The tuning-fork is brought to sound under the water, and the receiver on the other end will give undeniable evidence. The lowering may be a fifth, but hardly an octave. The human voice is not influenced. It may be difficult to prove that actually, but so far I could not find any evidence of it.

Dr. E. COOSEMAN (Brussels) read a paper on the hearing-power of "beetlers." **Contribution to the study of "occupation" deafness.**

We have long recognized the injurious influence exerted on the organ of hearing by certain manual occupations carried on in the midst of a violent noise. Among these "noisy occupations" mention has not yet been made of the "beetler,"—that is to say, of the worker in linen,—who carries on his occupation in the midst of the noise of the "beetling" machine, composed of twenty metallic hammers, each weighing 100 kilos and giving 400 strokes a minute. In the workshop of which the workers have been examined by the writer, there are twenty machines of this kind or similar to them. When all the machines are working together we may calculate that they give 160,000 strokes in the minute. The noise thus produced resembles the continuous rolling of thunder, which shakes the workshop and everything in it.

The number of workmen examined amounted to seventeen. Most of them were seen a few hours after leaving the factory. All complained of hearing badly immediately after leaving off work; but the delicacy of hearing returned by degrees after two or three hours to such an extent that, after their Sunday repose, they felt that they heard almost as well as other people of their age.

The workers examined have been exposed to the "beetle" for a length of time varying from two to thirty-nine years, six days every week, from six in the morning to six in the evening.

The remarkable fact, which at first sight seems almost incredible, is that not one of them is absolutely deaf, not even a man of sixty-one years of age, who has worked at the "beetle" machine for thirty-nine years. His hearing is absolutely normal.

In fourteen out of the seventeen the writer has detected various lesions of the nose, of the pharynx, of the ear, or the presence of inveterate habits of the abuse of alcohol or tobacco, which predispose to the diminution of hearing.

The author explains the innocuous character of the noise in question to the fact that it is extremely dull, although violent, and that it is continuous instead of being intermittent, as in many other occupations.

The writer has come to the following conclusions:

All noisy trades are not necessarily injurious to the hearing.

In order that they should be injurious the following conditions are necessary :

1. That the workmen should be predisposed to affections of the ear by the existence of lesions of the nose or pharynx, or else by inveterate addiction to alcohol or tobacco.
2. That the noise should be intermittent.
3. That it should be of a comparatively high-pitched tone.

D. G. (*Trans.*).

Dr. W. MILLIGAN (Manchester) read a paper on **some observations upon the diagnosis and treatment of tuberculous disease of the middle ear and adjoining mastoid cells.**

Mr. President and Gentlemen,—The widespread interest which has of late been manifested in this and other countries in the endeavor to check the ravages of tuberculous disease in its numerous forms has an interest to the otologist, not only on account of the general merits of the case, but more especially on account of the frequency with which tuberculous lesions are met with in and around the middle ear.

The factors which come into play in producing tuberculous lesions of the middle ear and its adnexa are but imperfectly understood, and their investigation opens up a wide field for research and experiment.

Does the bacillus gain entrance to the middle ear by way of the Eustachian tube, or is it conveyed along the vascular or lymphatic channels? What also is the relation between tuberculous naso-pharyngeal adenoid vegetations and tuberculous middle-ear disease?

Questions such as these are not easily answered, and yet their solution must appeal to all as being of much importance.

For some years past I have been particularly interested in this subject, and as opportunity has presented itself, have endeavored to investigate these questions both in their practical and in their scientific aspects.

That a large proportion of the cases of suppurative middle-ear disease with accompanying bone lesions met with in practice are of a tuberculous nature, will, I think, be admitted by all, and that the prognosis in such cases is not very favorable will, I believe, be conceded by those who have had large clinical experience.

The characteristic features of tuberculous middle-ear disease may be somewhat masked on account of an accompanying pathogenic infection, and an accurate diagnosis may be impossible if

one relies upon finding the bacillus of tubercle in the secretion from the middle ear.

Time after time it has been my experience to examine cover-glass preparations of pus from the middle ear for bacilli, and with negative results, although the tuberculous nature of the lesion has been proved beyond all doubt by means of inoculation experiments and by the subsequent clinical history of the case.

In my experience primary tuberculous lesions of the middle ear and adjoining mastoid cells are comparatively common, especially among the children of the poorer classes, and I believe also that secondary tuberculous infection from such a primary focus is by no means of infrequent occurrence.

Amongst causes which may be considered predisposing are the following: (1) hereditary tendency; (2) unhealthy environment; (3) unsuitable feeding; (4) exposure to infection from tuberculous relatives; (5) the presence of tuberculous nasopharyngeal adenoids.

The relation of nasal obstruction to tuberculous middle-ear disease deserves special consideration. In many of my cases post-nasal adenoids have been present, and in a small proportion have themselves been tuberculous. The almost constant degree of Eustachian catarrh which their presence implies produces a soil which is favorable to the growth of the tubercle bacillus, and once it has found a footing in the middle ear the conditions favorable to its development are present, viz., a suitable soil, absence of light, a more or less uniform temperature, etc.

In the early stages these tuberculous foci appear as slightly elevated yellowish points in the mucosa, after a time coalescing and breaking down to form superficial ulcers.

Should the deposit occur upon the inner aspect of the membrane, perforation ensues. Such perforations may be multiple, and the destruction of tissue is usually quite painless. The edges of such perforations have a pale, indolent-looking appearance, and the accompanying discharge from the ear is usually thin, ichorous, and frequently foetid.

Within the mastoid cells such deposits are also frequent, and I am inclined to think that in some cases, at least, the disease begins first of all within the mastoid, and subsequently spreads to the middle ear. At a very early stage the bone becomes affected, and undergoes an amount of destruction which is almost inconceivable, considering the comparatively slight external indications present.

In some cases which have come under my observation practically the entire cancellous tissue of the mastoid—occasionally of both mastoids—has been eaten away, leaving merely a bony shell upon which the middle fossa is poised. Owing to this early and extensive destruction of bone, the facial nerve in part of its course is exposed, with resulting facial paralysis. In fact, early facial paralysis in a case in which sthenic symptoms have been absent should, I hold, always be looked upon with suspicion and as a probable manifestation of an underlying tuberculous lesion. Early implication and enlargement of the glandular structures around the ear is also a most important symptom, and when masses of enlarged glands occur around the ear any discharge from the tympanic cavity should be microscopically examined for bacilli.

To definitely establish the fact that the aural lesion is of a tuberculous nature the characteristic bacillus must be found. This may be an exceedingly difficult task, but in all cases it is worth while staining and examining the secretion from the middle ear.

Should no evidence of its presence be found in this way, small pieces of granulation tissue may be removed by forceps pressed between two cover-glasses and stained in a suitable manner. Occasionally bacilli will be found in such preparations. The method which I believe gives the most reliable results, however, is the inoculation of guinea-pigs with small fragments of tissue removed from the middle ear or adjoining mastoid cells, and I believe that it is advisable to inoculate with fragments of bone and mucous membrane removed from an area where the disease is seen to be advancing. In many such cases when the mastoid has been opened for the purposes of treatment, a pultaceous-looking mass will be found filling up the cavity, but this material is practically valueless for experimental purposes, consisting as it does of broken-down tissue, inspissated purulent débris, and epithelial cells. When, however, it has been removed by means of a spoon and the underlying bone exposed, it will be seen where the disease is making progress, and from where a scraping of bone should be taken. In my experiments I have inserted a fragment of tissue obtained as above described into a guinea-pig's hind-leg just about the knee-joint, all hair having previously been removed by singeing with a platinum knife. A small pocket is now made with a sterilized needle, and the tissue carefully inserted. In a few weeks' time, should the tissue inoculated be tuberculous, the inguinal glands will be found enlarged, and as time goes on the tuberculous

virus will be found to have spread over the animal's body, the glands and viscera being attacked in the following order, according to the results obtained by Professor Delépine :

During the second week after inoculation the lymphatic ganglia upon ~~the same~~ side of the body below the diaphragm and the spleen will be found enlarged.

During the third week, the liver, the mediastinal and the bronchial ganglia.

During the fourth week, the lungs, the cervical and the axillary ganglia.

After the fourth week some of the lymphatic ganglia of the opposite side of the body below the diaphragm become affected, but this takes place extremely slowly, and the sublumbar and popliteal glands escape for a considerable time.

Microscopic sections made from these glands, and stained for bacilli, will frequently be found to reveal their presence.

In this way a definite diagnosis of the actual character of the underlying lesion can be made, and the value of the knowledge thus obtained is naturally immense, both as regards prognosis and treatment.

The course of such tuberculous lesions is only too often a downward one, despite the most elaborate and painstaking treatment. The practical difficulties encountered in removing tuberculous deposits within bone are immense, and in no region of the body are these difficulties greater than when tubercle attacks the temporal bone, for reasons which must be obvious to all here.

The complications which have to be feared are : (1) meningitis, (2) tubercular enteritis, (3) general marasmus.

The treatment of such cases must be considered from two points of view, according as it is non-operative or operative. Cases will be met with, especially in infants, where any operative interference will from the first be seen to be hopeless.

Such are the cases where marked debility and emaciation are present, where advanced facial paralysis and masses of enlarged glands have been early symptoms, and where the discharge is abundant, foetid, and frequently blood-stained. In such cases palliative measures, antiseptic treatment, and, if possible, residence at the seaside, are indicated, but I am bound to say that in the majority of such patients whose cases I have followed an early death has been the usual history. The prognosis in such cases I believe to be essentially bad.

In other cases, however, where the present condition of the patient is good (and often enough it is so), and where the tuberculous lesion may be regarded as primary and local, much can be done by suitable operative interference. It is almost superfluous to say that the first and the main essential is to provide free drainage. This implies opening and cleansing the mastoid cells, and it is a remarkable fact how often in such cases, without any external and objective sign or indication, the mastoid cortex will be found extensively perforated, and a pultaceous mass immediately exposed to view. Under good illumination a very careful toilet of the part should be effected, and this can generally best be done by means of a sharp spoon. All softened and carious bone must be scraped away, and as smooth a cavity left as possible, even if this necessitates laying bare the dura and walls of the lateral sinus. The cavity thus obtained should be allowed to granulate from the bottom, and care must be taken to stimulate any sluggish area by means of applications of chloride of zinc, nitrate of silver, etc. Frequently more than one scraping is necessary as fresh foci of disease appear. In one particular case which came under my treatment some years ago, and where the cause was proved to have been feeding with milk from a tubercular cow, five separate operations had to be undertaken before the morbid process was eradicated, which, however, it finally was, and the child has now grown up a healthy and sturdy boy. In very many of the cases the middle ear has been so extensively destroyed that its function as an organ of sense may be disregarded. Under such circumstances its contents should be freely curetted, and middle ear, antrum, and mastoid cells thrown into one cavity, and allowed to become obliterated by means of healthy granulation tissue. Where, however, a fair degree of hearing is present, efforts should be made to preserve the function of the organ so far as is possible.

An important point arises in connection with the treatment of the accompanying enlarged glands. Some of the glands may be enlarged purely as the result of septic absorption, and if the morbid cause be removed this enlargement will gradually subside, especially if aided by suitable treatment. But many of the glands are of a tuberculous nature, and are prone to undergo caseous degeneration, while at the same time they are a source of possible systemic infection. Hence I hold that after the mastoid area and the cavity of the middle ear have been attended to, and as soon

as the condition of the patient admits of it, another operation should be undertaken with the object of removing these enlarged and tuberculous structures.

The facial paralysis which so often accompanies tuberculous disease of the middle ear is unfortunately usually permanent. Something may, however, be done by facial massage, and the internal administration of strychnia to assist in maintaining the tonus of the facial muscles.

General treatment, such as the exhibition of cod-liver-oil, iodide of iron, syrup of iodine, etc., is useful, as also are change of air and liberal diet. The general conclusions from a study of these cases may be summarized as follows :

1. That primary tuberculous disease in and around the middle ear is of fairly frequent occurrence, and that it most usually attacks the children of the poor, especially the poor of our larger cities.
2. That a generalized tuberculous infection may arise from a primary focus within or around the middle ear.
3. That the prognosis in such cases is not very favorable, at least 40 to 50 per cent. of the cases succumbing, even after operative treatment has been undertaken.
4. That in many of the cases operative interference is contra-indicated, owing to the extent of the existing disease and the asthenic condition of the patients.
5. That when operative interference is feasible, the main object should be to scrape away all available foci of disease and to provide efficient drainage.
6. That the best and the most reliable means of establishing the tuberculous nature of the disease is by means of properly conducted inoculation experiments.

Dr. ARTHUR HARTMANN (Berlin) read a paper on **congenital and acquired atresia of the meatus externus.**

Dr. Hartmann referred to previous reports on atresia auris congenita, which he considers should more correctly be regarded as absence of the external meatus.

He demonstrated two preparations with plaster casts of the rudimentary external ears of the same.

The first specimen was from a new-born infant, in which on both sides there was complete absence of the annulus tympanicus and membrana tympani, whilst the tympanic cavities and ossicles, though present, were not quite normally developed. In the

✓ second specimen, from an adult, the external meatus—*i.e.*, the pars tympanica and membrana tympani—was completely wanting. The articular surface for the jaw was on the anterior surface of that portion of the temporal bone which normally forms the posterior wall of the meatus. In this case also the tympanic cavity, the ossicles, and the antrum mastoideum were somewhat abnormally developed.

These specimens were important in their bearing on the question of the operative establishment of an external auditory meatus in cases of atresia congenita. They showed that this was not possible.

It is well known that even with both meatuses absent, hearing and understanding of speech can exist.

Reports of complete acquired closure of the meatus were rarer than those of congenital absence of the meatus. Dr. Hartmann reported a case he had seen in which after diphtheritic-scarlatinal otitis the ossicles on both sides came away, and later complete bilateral bony occlusion of the meatus supervened.

Sufficient hearing-power remained to prevent the onset of deaf-mutism, loud speech being heard. On one side the meatus was restored by operation. After turning forward the auricle the new-formed bone was chiselled away, and the cavities of the middle ear laid bare, as in the radical operation. The meatus was covered by means of Körner's flaps. Healing was very slow. The hearing was considerably improved.

In the discussion which followed Dr. HOLINGER (Chicago) said that the paper was very interesting to him, because he was at present faced with the question whether to operate in such a case. In examining 510 children of the Institute for the Education of the Deaf and Dumb, in Jacksonville, he found a girl of fifteen with absence of both auditory canals. The girl was growing more and more deaf on account of constantly recurring attacks of otitis media. The first attack came on after scarlet fever, and the pus broke through the mastoid. The question of operation answered itself. He should operate in the following way. He should chisel behind the auricle down to the middle ear, and remove the malleus and incus. He should allow the wound to granulate and then cover, according to Siebenmann, with Thierch's grafts. Thus he should create a canal behind the ear. The operation would be to improve hearing and to stop the recurrence of the suppuration.

Dr. HARTMANN, closing the discussion on his paper, said : It is not advisable to operate on such cases as long as there is no inflammation. I do not believe that an operation according to Professor Siebenmann will improve the hearing-power. If there is recurrent inflammation, as in the case of Dr. Holinger, we may proceed as he advised.

Professor V. UCHERMANN (Christiania) read a paper on **rheumatic diseases of the ear**, which he sums up as follows :

1. Rheumatic fever is sometimes preceded, sometimes accompanied, by otalgia, alone or together with an acute swelling and injection of the drum and the adjacent bony meatus, followed by a serous or sero-fibrinous secretion of the middle ear (otalgia, myringitis, otitis externa, otitis media rheumatica), or it may be complicated during its progress with affections of the middle ear and the internal ear (labyrinth, perhaps the auditory nerve).

2. There are other more independent rheumatic ear diseases with persons of a rheumatic constitution or tendency (previous rheumatic fever, etc.). The ear affection appears as an otitis media serosa with yellowish, half-fibrinous exudate, or as a (secondary) sclerosis with progressive character.

3. The characteristics of the different forms are : In the *acute* forms—painfulness, excessive injection, and the tendency to the formation of fibrinous exudates. In the *chronic* forms—the tendency to the formation of fibrinous exudates, and the tendency to affect the bony capsule, with severe tinnitus and slow but steady progression. Salicylic acid seems to influence the acute forms but not the chronic. These latter, judging from the experience of a case at present under my treatment, are perhaps more influenced by a general rheumatic treatment.

In the discussion which followed Dr. HARTMANN said : The paper of Dr. Uchermann reminds me of one patient who probably comes in this line. A man slept one very cold and wet night in the woods ; when he awoke he found he had completely lost his hearing.

Dr. UCHERMANN, closing the discussion, said : It is possible that Dr. Hartmann's case comes in this line, but we will have to differentiate between acute catarrhal inflammation of the ear and rheumatic inflammation of the middle ear. One is easily amenable to treatment with salicylic acid, the other is not. Furthermore, in rheumatic cases we always find other manifestations of rheumatism ; exceptionally, rheumatic otitis shows infiltration and exudation in the ear alone.

Dr. T. BOBONE (San Remo) read a paper on **the early involution of adenoid growths on the Riviera.**

The paper was a contribution to the ætiology of adenoid growths. Dr. Bobone said he had for some time been struck by the fact that adenoids are excessively rare amongst the natives at San Remo. Moreover, he had observed that adenoids met with in patients coming to the Riviera, and for the removal of which the parents would not consent to an operation, slowly involuted; so that some months afterwards nasal respiration became possible, speech was much improved, the tendency to taking cold and to coughing with very slight provocation was lost, and the normal development of the child took place. Dr. Bobone is of the opinion that pure and simple involution of the adenoid growth, although not generally admitted, is possible; and this involution he attributes to the same cause as the scarcity of the vegetations amongst the natives. That cause, he says, must be looked for in the dryness of the climate and the clearness of the atmosphere on the Riviera. The other ætiological factors for adenoid vegetations mentioned by writers on the subject, such as geographical latitude, diatheses, discharge from the nose, infectious fevers, are also to be met with at San Remo, and notwithstanding this the adenoid vegetations, as already stated, are so rarely met with. Dr. Bobone believes the most important factor to be the humidity of the climate of the country, and that the greater the humidity the larger will be the number of children with adenoids. He has been able to demonstrate this fact by collating the geographical distribution of adenoids in Italy, and he gave a table showing that the frequency with which the cases are met with increases directly with the humidity of the climate of the different localities referred to.

Dr. Bobone is also of the opinion that a factor which frequently complicates a simple case of adenoids is inflammation-adenoiditis. In the localities where the vegetations are most frequently met with there also is a corresponding increase in the attacks of adenoiditis, favored as it is by the cold, fog, and the damp, whereas on the Riviera the warmth and dryness of the climate are unfavorable to the development of these attacks, and when the vegetations are not irritated by inflammation the involution can take place. Dr. Bobone added that in cases in which the parents would not consent to an operation the good results he had obtained by treatment he attributed more to the action of the climate than to other remedies.

Dr. RUDLOFF (Wiesbaden) read a paper on **the operation for the removal of adenoid growths with the head hanging over the table, while the patient is under the influence of chloroform.**

In his opening remarks Dr. Rudloff drew attention to the method of performing operations on the hanging head, in cases in which there is danger of blood suction. He then described his method, of which he had made use during the last eleven years. His experience included over seven hundred cases. He advocated the free administration of chloroform, and employed Boecker's and Hartmann's curette in performing the operation. In describing the method of operating he drew attention to the following points :

I. Adenoid growths occasionally have their origin in Rosenmüller's fossæ. In removing them it is important (*a*) to avoid injury to the pharyngeal orifice of the Eustachian tube ; (*b*) to bear in mind that the tissue surrounding the carotid artery extends into the lateral wall of the fossa, and that danger of injury to this artery is to be guarded against. How necessary this warning is, is proved by the case recorded by Schmiegelow.

II. Adenoid growths must be thoroughly removed (*a*) in order to avert as far as possible the danger of recurrence ; (*b*) because a certain percentage of the cases which occur are tuberculous.

III. If the tonsils are enlarged it is advisable to remove them some time previously.

Dr. Rudloff illustrated his method by means of a specimen (sagittal section through the head), and exhibited the instruments he employed. He further showed casts illustrating the varying dimensions of Rosenmüller's fossæ and the relation existing between these fossæ and the orifices of the Eustachian tubes, and referred to a specimen showing the relation between the carotid artery and the lateral wall of Rosenmüller's fossæ, which was exhibited in the congress museum. His statistics recorded a recurrence of three and a half per cent. In concluding he remarked that he did not necessarily confine himself to the method he had described, but adapted it to the individual requirements of the cases which came under his care.

DUNDAS GRANT, M.A., M.D., F.R.C.S., read a paper on **diminished bone-conduction as a contra-indication for ossicectomy.**¹

¹ Contribution to the Proceedings of the International Otological Congress in London, August, 1899.

With very few exceptions, all authorities in otology are agreed that under certain circumstances, namely, as the result of adhesions arising from purulent or non-purulent inflammatory changes, the malleus, incus, and membrana tympani, whether whole or incomplete, are useless and even prejudicial for the transmission of sonorous vibrations to the stapes, and under such circumstances the question of their removal may be usefully considered, quite apart from the major operations required for the saving of life, and, indeed, the performance of ossiculectomy becomes a duty.

If the outer ossicles are fixed, and hamper the movements of a presumably or possibly mobile stapes, their removal is indicated on account of the hearing-power, apart from other and even weightier considerations. Of course, we must not remove ossicles if our so doing is at all likely to make the hearing worse—that is to say, if these ossicles are of functional value. How are we to decide on this point? According to Politzer, hearing for the whisper at the distance of 1 metre is a very strong contra-indication against ossiculectomy. If the deafness is entirely or to a great extent due to concomitant disease of the internal ear or auditory nerve, it is obvious that the results, *quâ* hearing, obtainable from ossiculectomy can be of little or no value. Diminished bone-conduction is therefore a contra-indication. In suppurative cases it suggests a labyrinthine complication, and, it may be, a tuberculous affection of the petrous bone, as without this the tendency is for the tympanic changes to bring about an increase of conduction through the bones.

Two cases are reported to illustrate some improvement of hearing by ossiculectomy though bone-conduction had been diminished.

Summary. The presence of the ossicles may interfere with the hearing-power in post-suppurative cases in the following ways :

1. By being fixed themselves, and thereby making the stapes immobile.
2. By favoring the accumulation and retention of desquamative and exudative products which impede the movements of the stapes.
3. By preventing the application of a cotton-wool drum to the stapes.

Their removal is under these circumstances justifiable and desirable, if the hearing-power is less than for the whispered voice at 1 metre and the bone-conduction is good.

Even if the bone-conduction is diminished to some extent, a slight

improvement in hearing may follow the operation of ossiculotomy. A very slight improvement in hearing may make the difference to the patient of being able to follow his employment.

Therefore, when hearing is so bad that the patient is unable to follow his employment, it is justifiable to remove the outer ossicles and remains of the membrane, even though there is some diminution of bone-conduction.

Dr. ALLAN T. HAIGHT (Chicago) read a paper on **naso-pharyngeal adenoids as a causative factor in ear diseases.**

The general belief that adenoid vegetations were never present after the thirtieth year was contradicted by Couetoux, of Nantes, who operated upon a man of sixty-five to cure a marked unilateral deafness. Dr. Haight had found vegetations in ages above sixty, and frequently between thirty and forty. They did not differ histologically from adenoids in children.

As to treatment, he should say it was never too early nor was it ever too late. At the first recognition of existing growths the operation should be performed at once. He had found that curetting was the only true basis of treatment. He was not a believer in general anæsthetics in children over the age of twelve, as local anæsthesia after twelve made such an operation absolutely free from danger; but there were some cases where a general anæsthetic must be administered, especially in refractory children and nervous adults. In children it was advisable to anæsthetize in a sitting posture, and he preferred bromide of ethyl to any other of the numerous anæsthetics.

Professor KNAPP advocated the use of ether in children as in adults. There was no danger, for only an initial anæsthesia was needed.

Dr. EEMAN (Ghent), Professor GRAZZI, and Dr. GRADENIGO also joined in the discussion.

Wednesday, Aug. 9th.

MORNING SESSION.

The subject for general discussion, **the indications for opening the mastoid in chronic suppuration of the middle ear**, was opened by Professor POLITZER (Vienna), Professor MACEWEN (Glasgow), Dr. LUC (Paris), and Professor KNAPP (New York).

PROFESSOR POLITZER said it was a happy idea of the Organization Committee to have put on the programme a discussion on

such an important question. There is no question of otology which had acquired more actual interest than the free opening of the middle-ear spaces for chronic suppuration of the middle ear. Experience had shown that the free opening of the middle-ear spaces is of the most vital importance, by which we are able to save the life of the patient and prevent other consequences to the middle ear hurtful to the organism. The indications are generally acknowledged, and in most cases with well-marked symptoms the surgeons were likely to be in perfect agreement; therefore there could be but little new to say in reference to the indications. The chief point in that discussion would be to decide whether it is justifiable without well-marked symptoms to operate as frequently as some operators maintained. Professor Politzer enumerated then all the indications for the so-called "radical operation," giving after his own experience a complete critical view on the subject, the details of which will be published in the *Transactions of the London Otological Congress*. He concluded that experience taught him that not rarely the clinical symptoms did not correspond to the pathological changes found during the operation in the temporal bone. Sometimes only insignificant changes, such as a small quantity of granulation tissue in the attic or antrum, were found in cases where he had performed the operation on account of dangerous symptoms. On the other hand, he found grave changes where before the operation he would not have expected them.

These circumstances render it more difficult to draw strict lines in regard to the indications, and there would always be cases in which some surgeons, on account of the impossibility of predicting exactly the pathological changes in the temporal bone, would hold that it was not advisable to wait for the appearance of well-marked symptoms, but to operate at once, while others would advocate more conservative methods. That many cases of chronic suppuration of the middle ear could be healed by vigorous antiseptic treatment after removing granulations or cholesteatoma in the tympanic cavity and the attic and partially removing the wall of the attic, had been shown by the daily experience of those surgeons who treated such cases by conservative methods. Although he is a strong advocate of the radical operation in suitable cases, he could not agree with those surgeons who performed it often for the mere purpose of the discharge—at least, until strenuous efforts had been made to stop it by other means. He thought that in

these cases it is not justifiable to have recourse to an operation which, although not necessarily dangerous in the hands of a skilled operator, is still a serious one, especially when we consider (1) the many important structures in the vicinity which might be injured, (2) the possible permanent impairment of hearing in those who before the operation could hear fairly well, (3) the protracted healing process after the operation, which very often render the patient *hors de combat* for many months. It is his firm belief that these views would in course of time receive general assent, when further anatomical researches and more extended clinical observations had cleared up those points about which at present their judgment is still in doubt.

Professor WILLIAM MACEWEN (Glasgow) said: Mr. President and Gentlemen,—I have to thank you for the honor you have conferred upon me by asking me to open a discussion on the indications for opening the mastoid in suppurative otitis media.

Instead of enumerating the individual indications for opening the mastoid, which may be found in more or less detail in most recent otological works, and which may require to be supplemented or reduced as our experience ripens, it is thought desirable to regard the subject from a broader basis, and one which may be found more generally applicable. The following forms a useful practical rule:

When a pyogenic lesion exists in the middle ear, or in its adnexa, which is either not accessible or which cannot be effectually eradicated through the external ear, the mastoid antrum and cells ought to be opened.

As there are many ways of opening the mastoid, some more and many less complete, the observations made in this note cannot be equally applicable to all of them.

Some operators content themselves in opening the mastoid by sinking a narrow shaft into the antrum, through which they can inject fluid, and others perform a typical operation irrespective of the pathological condition revealed.

The speaker does not follow the classical operations of Kuester, Stacke, or Schwartze, but operates by first opening the mastoid at the base of the suprameatal triangle. From that point he follows the pathological lesions anteriorly into the middle ear, especially exposing and carefully scrutinizing in all cases the attic of the antrum and tympanum, when, if found eroded, these plates are removed, along with the morbid contents of the middle ear. We

then pass backwards and downwards, through the mastoid cells toward the sigmoid sinus, following the pyogenic erosions wherever they may lead in that direction, and when necessary exposing the knee of the sigmoid sinus. After opening the mastoid antrum and cells, the further procedure has a purely pathological basis; if the disease revealed be extensive, so must be the operation. The greater part of this operative procedure is performed by means of the rotatory burr, which is the safest instrument for such a purpose. One of the first objects of the operation is to secure the patient against subsequent pyogenic extension to the brain on the one hand, and the cerebellum and sinus on the other; and this may be done with a probable certainty, as far as the two most frequent localities for brain and sigmoid sinus invasion are concerned. It is to such an operation (with its pathological basis) for "opening the mastoid" that the following remarks apply:

The ablation of the mastoid, while at once eradicating a suppurative process, chiefly located in the mastoid antrum and cells, affords at the same time ready access to the attic and inner wall of the tympanic cavity, and to the auricular extremity of the Eustachian tube. Immediately following the operation, one can initiate the formation of a vascular tissue, and thus create an efficient barrier against pyogenic extension to the otherwise most accessible and most vulnerable parts of the brain, the cerebellum and the sigmoid sinus.

In persistent otitis media purulenta, the mastoid operation has at least three advantages over that of the treatment by way of the external auditory meatus: First, by exposing to ocular inspection all the affected area, thus enabling the operator to follow and eradicate all the recesses in the bone made by pyogenic invasion. In this way one does not act in the dark, as the whole pathological field is open to inspection. Secondly, by being able to secure asepsis. Thirdly, by raising an efficient barrier against pyogenic extension between the most vulnerable parts of the brain and the sinus.

INDICATIONS FOR OPENING THE MASTOID IN PURULENT OTITIS MEDIA.

1. There are many cases of purulent discharge of the middle ear, of such long standing, and so intractable to all remedies administrable through the external auditory meatus, that most surgeons would agree that in such the mastoid ought to be opened.

When the symptoms are obtrusive, the pain severe, the discomfort great, the discharge profuse, and possibly foul-smelling, the patients themselves will probably demand relief, which the otologist will readily grant. It is not, however, to such pronounced cases that special attention is here directed. It is rather to those in which the decision is much more difficult, especially in the presence of very slight discharge, continuous, though apparently subdued by treatment. Many believe that very slight though persistent otorrhœa can lead to no untoward result, the patient living a considerable number of years, possibly even a long life, with the discharge never properly away, and yet not sufficient to arrest attention. Its long duration causes the bearer of it to pay little attention to it, and by-and-by it may be disregarded, and even forgotten.

The pyogenic process may, however, proceed inwards, giving rise to symptoms often misunderstood or attributed to other causes, and may eventually either prove fatal or, by undermining the constitution, thereby pave the way for the advent of other lesions. Many patients thus affected, though able to pursue their usual avocations, are yet subject to periods of malaise, with occasional recurrent slight febrile attacks, irritability, and nervous hypersensitiveness, exhibited in unevenness and irascibility of temper, which attacks last from a few days to a week or more, leaving the patient slightly weaker, though relieved from the depression, and fit to enjoy life. These attacks are so frequent, and the patient becomes so used to them, that he comes to regard them as part of his ordinary habit, and often attributes them, with considerable plausibility, and sometimes with point, to colds, chills, biliousness, indigestion, etc.

When they occur, however, in the presence of pyogenic otorrhœa of old standing, they may bear a different interpretation, and in the absence of other definitely assignable causes they may be considered as the result of slight absorptions. In some cases the cause and effect are a little more evident, as when patients have pyogenic pulmonary catarrh with organisms in the lung secretion similar to that found in the slight purulent otitis media, and when these pulmonary attacks are mainly coincident with the recrudescence of the otorrhœa. In some such slight cases, after every other assignable cause was exhausted, and after treatment in other directions had failed, the mastoid was opened, when, in the midst of eburnation and sclerosis of the bone, marked osseous erosions,

containing small quantities of secretion filled with pyogenic organisms, were found, and generally these led more or less directly to the sigmoid sinus, the coats of which bore evidence of long-standing irritation, and through which, no doubt, the pyogenic absorptions had taken place.

After the operation these patients became greatly improved in health, all their old general symptoms having disappeared, along with the cessation of the otorrhœa.

Cases with a history of an initial period somewhat similar to the above have been seen at a later stage by the author, coming under observation in a moribund condition from pneumonia, due to septic infections from thrombosis of the sigmoid sinus, originating in a purulent otitis media of old standing; the passage between the cells and the sigmoid sinus being in some instances very small and tortuous, and not unlike those apertures seen in the cases with slight symptoms just referred to.

When it is recollected that in many instances the otitis media purulenta is obscure and overlooked, and that the symptoms of the purulent absorption may be of a "typhoid" as well as of a "pulmonary" type, one can easily understand that death may be attributed to pneumonia or to enteric fever.

It is quite true that with chronic otitis media purulenta a fatal issue ensues only in a limited number of cases, a proportion, however, perhaps greater than is generally believed, but as one cannot, with any data obtainable at present, foretell which of these apparently slightly affected patients are to become the victims of a fatal issue, ordinary prudence dictates its removal even while it is slight.

It cannot be too often recalled that the virulence of the otorrhœa cannot be measured by the quantity of the secretion, its odor, or the slightness of its initial symptoms, and that the pyogenic process may proceed insidiously until some slight exciting cause or accidental circumstance precipitates a dangerous or fatal crisis.

2. Another question arises, whether there be lesions in the middle ear, which, though it may be mechanically possible to remove them through the external auditory meatus, could yet be removed with greater safety through the mastoid. This must be answered affirmatively, while the middle ear and its adnexa are in a septic condition, and when by application through the external auditory meatus they cannot be made aseptic prior to

the performance of an operation entailing the exposure of a fresh surface to the action of pyogenic organisms and their products. To operate through the external ear under such conditions is to court disaster. By opening the mastoid one can efficiently remove therefrom the suppuration, and can eradicate its cause, after which any operation involving exposure of a fresh surface can be proceeded with in safety.

In numerous instances, cases of intracranial pyogenic extension have occurred in immediate sequence to the removal by way of the external auditory meatus of granulation tissue masses—so-called “aural polypi”—which were protruding into the middle ear. Some of these granulation masses protrude through the bone from the dura mater, which they serve to protect, *as long as they remain intact*, but when they are removed a fresh surface with open mouths of vessels is exposed, and absorption through the softened brain membranes is apt to occur.

Besides rendering the operation safe by asepsis, the opening through the mastoid enables one to demonstrate the exact locality from which these granulation masses spring. This is difficult and sometimes impossible to do, by operating through the external auditory meatus. One must recollect that many of these granulation masses, presenting at the upper and back part of the middle ear, protrude through eroded bone, and that their presence is to be regarded as indicative of a diseased process which has attacked the osseous tissues as well as the soft parts; and therefore to an extent these granulation masses are symptomatic, and by removing them alone the disease is not removed, but only *one* of its indications.

As long as these masses are left *intact*, they may secrete, but they do not readily absorb, as they are destitute of lymphatics, and, therefore, in the midst of certain pyogenic organisms, not only may the granulation masses be left with safety, but they afford for the tissues from which they spring a definite protection from the invasion of certain pyogenic organisms. They are a provision thrown out by Nature in an attempt at repair.

In the presence of such granulation masses, one does not devise an operation merely for their removal, but for the eradication of the disease which has occasioned them. In removing them one has also to make provision that absorption will not take place through the wounded surface left thereby.

3. In many, if not all, of these persistent pyogenic otorrhœas,

the osseous tissue is involved, and it is very difficult, by means of treatment through the external auditory meatus, to eradicate the organisms that have housed themselves in the recesses of a minute particle of necrotic bone. In the interior of such harbors of refuge, situated in the mastoid, the pyogenic and other organisms are safe from any antiseptic wave or blast introduced through the external ear, and wait—and they have endless patience, even beyond that of the aurist—until the antiseptic has exhausted its energies, when they again sally forth, in the tide of a catarrhal effusion, disseminating themselves and affecting fresh areas. Erosion often steadily progresses within the mastoid cells, even when the middle ear has been rendered sweet. In such cases the surgeon would be deceived were he forming an opinion on the asepticity of the mastoid cells from the condition of the discharge issuing through an external ear which he has rendered aseptic by chemicals, as a slight pyogenic discharge issuing through such chemicals would probably be rendered aseptic in transit.

In other parts of the body, where a necrotic bone filled with pyogenic organisms is even exposed to view and of easy access, it is with the greatest difficulty, and sometimes it is impossible, to entirely destroy these organisms by direct applications of antiseptics of such strengths as the neighboring tissues would withstand without themselves being destroyed. If this be so under such conditions, how much more difficult must it be by way of the external ear to eradicate pyogenic organisms through hidden, narrow, tortuous, and sometimes almost inaccessible passages which are often found in the mastoid process and cells.

4. In recurrent cases of purulent otitis media, one cannot pronounce the patient safe even when the otorrhœa ceases—temporarily.

In one such instance, treated through the middle ear on the most approved principles, with great care, by an aurist of undoubted ability and experience, the patient, who had had a slight pyogenic otorrhœa, was pronounced cured by the aurist, the discharge having disappeared, and the condition of the middle ear appearing to him in every way satisfactory. Within about three weeks of this time the patient came under my observation, suffering from pronounced symptoms of cerebellar abscess, and was plunged in profound coma, accompanied with great respiratory difficulty. He was operated on, two ounces of pus being removed from the cerebellum, after which he made a rapid recovery.

The middle ear contained only a few drops of pus, the mastoid, antrum, and cells contained more, and an erosion in the mastoid exposed the sigmoid sinus, which was thickened, the disease having spread to the cerebellum by continuity of tissue.

With the data at the disposal of the aurist in this case it would have been difficult for him to have acted otherwise than as he did, and had he done so it would have been at variance with the teaching of the day. This case, however, demonstrates that the information obtainable by inspection of the middle ear is not sufficient to reveal the pyogenic invasion of the recesses of the mastoid region.

Had the case been treated by opening the mastoid in the way described, the formation of the abscess in the cerebellum would have been prevented.

5. Cholesteatoma and tubercular processes with secondary pyogenic involvement are also conditions for which the mastoid requires to be opened, and it is only in this way that these diseases can be efficiently removed.

6. The problems connected with the question of operation upon recurrent attacks of purulent otorrhœa are somewhat similar to those which arise in connection with appendicitis. Purulent otitis media and appendicitis have many analogies. They are both pyogenic, but while the latter is the result of the action of a well-known bacillus, whose course is definite, the former may be the result of one or other of a variety of organisms of greater or less virulency, and producing different pathological effects. Both are apt to invade neighboring structures, the one the peritoneum, the other the intracranial tissues. Both are insidious in their action, and as long as they exist they are apt to undermine the health and reduce the vigor of the individual. Both tend to precipitate a sudden serious illness, and one which is often fatal. In both an early and complete operation not only at once relieves the patient from the depressing effects of the disease, but at once removes the possibility of a sudden and fatal termination. In both, many, lulled into a sense of security by the apparent passivity of the disease and its long duration, and arguing from the fact that as the patients have recovered from one attack they are equally likely to recover from another, postpone operation until the peritoneum in the one case and the brain in the other become involved, and a fatal termination is imminent, but then it may be too late to save the patient.

7. With regard to the fauna occurring in that perfect incubating chamber, the middle ear and its adnexa, and their relative pathological significance, the time at our disposal prevents our dwelling at present further than to state that valuable indication may be derived from the identification of the particular form or forms of organisms which may be present in such cases.

8. After what the author has elsewhere written, he presumes that it may be understood that the opening of the mastoid must always be undertaken as a preliminary step to operating upon those intracranial lesions originating in purulent otitis media—abscess of the brain or cerebellum and sigmoid sinus thrombosis. To operate upon the several complications, and to leave uneradicated the paths by which pyogenic organisms enter, is to render the patient's recovery doubtful, and to expose him to fresh attacks.

9. Syme is credited with saying that diseases of the ear were of two kinds: the one which is curable, and is treated by the surgeon; the other which is incurable, and is treated by the aurist. Whatever be the special province of the present-day aurist or surgeon, let us hope that we relegate to neither many cases of incurable disease. The anatomy and pathology of the mastoid region were not understood in Syme's day, and the operation of opening the mastoid in its present conception was unknown. As the subject which you, Mr. President, have arranged for this discussion is the indications for opening the mastoid in purulent otitis media, we are precluded from entering into the consideration of the results attending that operation. The personal experience of the author leads him, however, to state that he regards the operation of opening the mastoid as the safest and most efficient way of eradicating otherwise persistent purulent otitis media. In conclusion, he adds that the more the pathology of purulent otitis media is studied, the more frequently the complete ablation of the mastoid recesses is undertaken, the fewer will become the so-called "incurable" cases of ear disease. He regards the operation of opening the mastoid as substantially contributing to the well-being of human comfort and happiness, and in materially lengthening life.

Dr. Luc (Paris) described the indications for opening the mastoid in chronic purulent otitis under the three following headings:

1. *In case of retention of pus.*—The symptoms may occur suddenly in the course of a chronic otorrhœa and resemble those of an acute suppuration. Pus is retained in the antrum by

exuberant granulations in the middle ear, and especially about the aditus; the patient, for the first time, experiences pain in the ear, usually referred to the base of the mastoid process, is feverish, and the general health is disturbed.

Palpation of the mastoid reveals tenderness to pressure near the base, varying according to the depth of the antrum. Operative intervention is indicated unless removal of granulations or polypi is sufficient to re-establish the drainage of pus and to alleviate the other symptoms. Pain is the one symptom which, if severe enough to prevent sleep, should induce us to operate. To wait in such an instance for the onset of other symptoms is to expose the patient to intracranial extension.

To these symptoms the more manifest signs of pus retention in the mastoid are frequently joined, namely, swelling, œdema, and redness of the skin. In regard to the extent of the operation necessary in these chronic cases, all of the cavities of the ear should be exposed and cleaned out, whether we proceed from the antrum to the attic (Zaufal) or in the reverse direction (Stacke).

2. *With a view to the radical cure of chronic otorrhœa.*—I think that you will agree to the correctness of the statement that every suppurating focus, however obstinate it may have been, does not resist surgical treatment if the entire suppurating surfaces have been exposed, cleaned, and drained. The anatomical relations of the antrum and attic explain the frequency with which they are affected in all cases of chronic otorrhœa, and the tendency they have of keeping up the suppurating process, as well as their inaccessibility to treatment through the natural passages. Stacke arrived at the following conclusions, to which my own experience has also led me, and upon which I desire to lay great stress: the mastoid antrum, a true posterior elongation of the attic, participates in the great majority of the cases in the suppurative process of the latter, and consequently should be simultaneously exposed and cleaned as soon as local treatment, applied for a sufficiently long time, has failed.

Clinically, chronic otorrhœa of antral origin presents itself under two forms according as there is fistula or not. The fistula is normally on the external surface of the mastoid, though it may be situated farther back or near the tip. More rarely it traverses the posterior wall of the auditory canal, or the perforation may have taken place at the inner wall of the process and led to the various pictures of a Bezold perforation.

In the cases where there is no fistula, the diagnosis is often difficult, and the term *latent mastoiditis* is appropriate for this class. The drum membrane is found perforated. The perforations may be generally classified in three distinct types :

(1) Perforation in Shrapnell's membrane just above the short process of the hammer.

(2) The circum-malleal perforation. The defect is almost total except for a remnant of the *Mt* about the handle of the malleus. Granulations occupy the posterior part, about the aditus, and with Hartmann's canula grumous and fetid pus can be syringed out of the region of the antrum.

(3) The postero-superior perforation, small in size, near the aditus. Small polypoid masses may present through this opening, invariably recurring after removal, and the irrigations give the same result as in the preceding cases. In all of these types of perforation, small, white, mother-of-pearl collections may be observed which are cholesteatomatous masses from the attico-antral region. In all of these cases, the focus is probably in the region of the attic or antrum, but this does not necessarily, according to my judgment, indicate the opening of the mastoid process and the attic. Local treatment with Hartmann's canula should first be tried ; if unsuccessful, the removal of the ossicles, especially in case of a Shrapnell perforation or where the ossicles are visibly diseased, should be accompanied by a thorough curettage of the walls. If the suppuration persists after several weeks of careful treatment, with return of granulations, and irrigations continue to bring forth fetid pus or cheesy particles, delay is no longer permissible, and the radical attico-mastoidotomy should be done.

3. *In case of threatening intracranial complications.*—In this class our intervention is urgently demanded by the real danger of a beginning meningo-encephalic infection. I should first say a word about facial paralysis occurring in the course of a chronic purulent otitis. It marks a progression in the destructive work of the process, and it is not infrequently followed by signs of intracranial infection. Hence the onset of a facial hemiplegia is a grave complication and demands prompt operative intervention, especially when other signs present make the operation justifiable.

The urgency for opening the mastoid becomes absolute if in the course of an intractable otorrhœa any sign of beginning intracranial infection appears, with or without retention of pus. It is

unnecessary to enter here into a description of the symptoms of intracranial infection. In the presence of certain symptoms called focal symptoms, it is best, as is now generally accepted, to first expose the cavities of the middle ear and then proceed guided by the symptoms and the conditions found at operation. Before arriving at the stage of confirmed intracranial infection the patient often passes through a premonitory phase which it is, of course, of great importance to recognize. In these symptoms we place first, headache, different in character, sometimes accompanied by photophobia, and the countenance appears contracted; vertigo often with nausea; bilious vomiting, like in confirmed meningitis; inequality of the pupils may be present, and fever. Under such circumstances the radical exposure of the middle-ear cavities should be extended up to the dura. The dura has usually been exposed by the morbid process in cases with meningitic manifestations. It is, however, our firm belief that at the first operation the dura should not be opened, for we have all seen meningeal irritative symptoms disappear after a simple extradural disinfection, and it is well known how the post-operative prognosis varies according as the dura has been opened or not. If after twenty-four hours the symptoms persist or are aggravated, the dura is then to be opened, behind which, often on the surface of the pia or at a slight depth in the brain, the sought-after focus is found.

CONCLUSIONS.

A. The opening of the mastoid is indicated in the course of a chronic otorrhœa for three distinct purposes:

- 1st. To give vent to the pus in case of purulent retention.
- 2d. To counteract menacing or initial signs of intracranial infection of aural origin.
- 3d. To cure the otorrhœa when local treatment and removal of the ossicles with curettage of the granulations have been without avail.

B. The operation is only urgent in the first two cases.

C. In all cases of chronic otorrhœa, the bony opening must extend from the antrum to the attic, or *vice versa*, and be followed by curetting and disinfecting of all the cavities of the middle ear.

D. In case of threatening intracranial complication, the bony opening must be extended to the suspected region of the dura mater, though the latter is not to be opened unless at a subsequent operation, if, after as short a period of watching as possible, the threatening signs are seen to persist or to increase.

Professor H. KNAPP (New York) said, in part, that we want not only to be informed that under certain conditions, which his predecessors had so exhaustively and authoritatively dealt with, the mastoid should be opened, but also when, how, and where, and, in particular, how extensively, it should be opened, the description of the mere technique or the operation, however, lying outside the question. When acute purulent otitis media was on the border-line of becoming chronic, or had just become chronic, opening of the mastoid was indicated both as a curative and prophylactic measure. The indication for opening the mastoid was strengthened if tuberculosis, diabetes, syphilis, or some other constitutional disease were present, especially in the case of children. He thought the frequency of relapses in children was owing to the structural conditions of the infantile mastoid. He mentioned a case which had come under his own observation, to show that the suppuration may leave the tympanic cavity, attic, and antrum, but extend into and beyond the tip of the mastoid. The pus cells in this case travelled through the condensed bones in passages so small that they could not be followed with the naked eye. The indications for operation in advanced cases of destructive subacute and chronic mastoiditis were absolute, and, in the relapses of suppurative mastoiditis, almost absolute. The prognosis in both cases was favorable. He had seen children recover who had a whole mastoid and a good deal of the adjacent temporal bone converted into gelatinous masses, and the dura extensively covered with soft, discolored granulations. The best treatment of cases which from the beginning showed a disposition to long duration was to perform the first opening of the mastoid, and conduct the subsequent local and constitutional treatment with the utmost care and perseverance, so as to prevent the affection from becoming chronic. As particular requirements in such cases, he should lay stress on (1) a large, deep, and angular incision of the drum-head and the adjacent part of the posterior wall of the ear canal as soon as there was bulging, (2) opening the mastoid and thorough removal of all diseased tissue, (3) enlarging the antral canal by cautious scooping, (4) watching the course of recovery, using dry treatment rather than syringing. In chronic suppurative otitis media without symptoms of mastoid involvement that had resisted topical treatment and intratympanic operations, attico-antrectomy was indicated. In many cases it was difficult to determine when this should be done. During

past years intratympanic operations had steadily lost ground. Many aural surgeons reported good results from the removal of the ossicles and cleansing the attic in cases of chronic otorrhœa with or without cerebral symptoms. But, unfortunately, the good results in most of them had not proved permanent. He alluded to a patient who had long been treated by intratympanic procedures, but received only temporary relief. Such cases had determined him not to lose much time with intratympanic operations although he would not go so far as an excellent otologist who told him that he had abandoned them altogether.

If the outer wall of the mastoid were perforated, and an abscess or a fistula present, it was indicated to evacuate the abscess and seek the perforation, and, guided by it and the fistula, open the mastoid freely and remove all morbid material. That was better than to let the patient take the uncertain chances of a spontaneous recovery, which was rarely complete and permanent.

If the disease extended beyond the mastoid process, the radical tympano-mastoid operation had to be followed by operations on the affected parts outside the ear.

If in chronic purulent otitis media the anterior wall of the mastoid bulges—which meant a suppuration in the cells adjacent to the posterior wall of the ear canal—a free incision down to the bone was indicated. We should then explore the wall with a probe, or, if the skin were swollen and painful, wait a few days to see whether the mastoid should be opened from the outer surface or from the anterior.

If the pus extended from the ear into the pharynx, forming a retropharyngeal abscess, he would open the mastoid and expose the tympanic cavity and attic clear to the tympanic orifice of tube, and free it as far as possible from pus and disintegrated tissue.

The extension of the disease to the posterior cranial fossa was so important and so frequent that the removal of the posterior wall, in particular that part of it which formed the sulcus of the sigmoid sinus, had been recommended and practised by some competent aurists in all cases. If the posterior wall showed no flaw at the closest search, and the suppuration was limited, he had left the wall alone; but when the contents of the mastoid had undergone extensive molecular disintegration, he considered the exploratory exposure of the sigmoid sinus and dura mater correct practice. Similar indications resulted from the extension of the

suppuration into the middle cranial fossa, an occurrence less frequent than its extension into the posterior fossa.

Extension of the suppuration in the petrous bone might indicate opening of the mastoid as an initial step for removing carious and necrosed portions of the petrous, or evacuate pus which had passed from the middle ear through the petrous bone into the posterior cranial fossa, producing an epidural abscess on the posterior surface of the petrous pyramid.

Meningitis in the first stage might be recovered from by the opening of the mastoid and the posterior and middle cranial fossæ, exposing boldly the posterior surface of the petrous and liberating the pus.

Necrosis of the different portions of the temporal bone indicated the opening of the mastoid in most cases.

It was evident, Professor Knapp said, in conclusion, that the opening of the mastoid in its recent development by the combined efforts of general and aural surgeons took rank amongst the most important operations.

Before the discussion Professor LUCAE (Berlin) read a paper on **the radical operation in chronic suppurative inflammation of the middle ear.**

"At the outset I cannot sufficiently express my high estimation of the operation in question as a means of cure in chronic suppuration of the middle ear, by means of which alone I have seen recovery brought about in a large number of cases. The following observations are intended to serve the purpose of diminishing the abuse of the operation as much as possible.

"In the University Aural Clinic in Berlin under my direction there have been from April, 1881 (date of the foundation of the stationary clinic), up to August, 1899, 1935 *operations for the opening of the mastoid process*, of which 852 were for acute, and 1083 for chronic, forms of suppuration.

"It is obvious that in only a fraction of the chronic cases in which operation was performed was the operation such as is known as the 'radical' one (opening of all the cavities of the middle ear), this having only come into general use within recent years.

"The treatment by means of irrigation with a formalin lotion, 15-20 drops to 1 litre (quart) of boiling water, has been adopted since 1895. This had a double advantage, because I was able to cure without operation the larger number of cases, or at least to improve them, and further that, if the remedy produced no

good result, the indication for operation was all the more distinctly marked."

Professor GUYE (Amsterdam) said the mastoid operation was a very great boon to the patient and to humanity in general, as Professor Macewen had so well said, but, nevertheless, as to finding the indication for mastoid operations only in discharge which did not give rise to dangerous symptoms he could not agree. He considered that the important thing in a case of chronic otorrhœa was to keep the meatus as clean as possible, the using of carb. glyc., and, thirdly, to have great care for the keeping open of the Eustachian tube.

Dr. MOURE (Bordeaux): "I am quite of the same opinion as the openers of the discussion, who do not hesitate to open the mastoid whenever a discharge from the ear resists medical treatment, followed or not by the extraction of the ossicles, when this treatment has been properly carried out. It is certain, however, that surgical treatment ought to be limited to some otorrhœas, and not practised in all, as seem to think the partisans of surgical treatment *à outrance*. When a purulent otorrhœa is accompanied by local pain; when irrigation directed towards the attic washes out cheesy matter, or, still more, mother-of-pearl pellicles; when the otorrhœa continues to be fetid, in spite of regular irrigation; when, finally, we see the granulations recurring, in spite of ablation or cauterization, still more if there are spots of caries towards the superior or posterior parts of the meatus—in all these cases we must not hesitate to interfere surgically. Moreover, it may be said that all those that have had occasion to perform a certain number of operations of this kind have a tendency the more they operate to be more and more ready to operate. They recognize the necessity for operating, as also the efficacy of surgical treatment, which alone affords the means of curing certain otorrhœas that are intractable under ordinary treatment."

Dr. McBRIDE (Edinburgh) joined views with Professor Politzer, Professor Lucae, and Professor Guye in their conservative methods with regard to mastoid operations. Professor Macewen had laid down that a persistent otorrhœa in itself was an indication for mastoid operation. Under certain circumstances it might be so, but by no means generally. The question came to be, What could they promise to their patients from a mastoid operation? In chronic cases they could promise the patient nothing. A certain proportion did not do well after the operation, the discharge

remained, and the patient was exactly where he was before. But he agreed with Dr. Knapp that they did not do quite enough operations in acute cases just beginning to become chronic. Here the discharge usually ceased, the membrane healed, and hearing was restored after draining through the mastoid.

Dr. JANSEN (Berlin) was prepared to endorse the statement of Professor Macewen, that frequently disease of the mastoid process did not show itself by outward signs. The question with regard to operative treatment is easier if, instead of making the diagnosis simply of suppuration of the middle ear, we ascertain beforehand which region of the middle ear is affected. Cases of suppuration in the lower section of the tympanum lie outside our question, but, nevertheless, it is only with great difficulty that we effect a cure if the disease is located in the large recess between the fenestra rotunda and the facial. Further, the rare form limited to the attic was also to be excluded from consideration, as it did not require to be exposed through the mastoid process. On the other hand, the complication of abscess in the tube, which was very rare, called for an opening through the mastoid process. There only remained the conditions localized in the antrum and mastoid process.

It was desirable to differentiate between antrum and mastoid suppuration, because suppuration limited to the antrum was often cured without operation. When the discharge was slight, and remained about the same in quantity, there was a great probability that an uncomplicated antrum suppuration was present. A more exact description of the symptoms which indicated retention and increased pressure in the antrum and mastoid cells than Dr. Luc had given, was possible, and would enlarge the number of cases in which the indication for operation was urgent.

Professor GRADENIGO (Turin) said that, having performed a great number of middle-ear operations by the retro-auricular method in cases of chronic suppurative otitis media, he had come to the conclusion that the indications for the operation, such as had been generally stated in the discussion, were exaggerated. For the purpose of healing simple chronic pathological conditions of the tympanic cavity, the extraction of the ossicles, or even of the hammer only, and removal through the external auditory canal of the posterior superior bony wall, were for the most part sufficient. In such cases the retro-auricular method did not give better results, and even exposed the patient to risks of various

kinds. It required a long after-treatment, difficult to be carried out, especially in children, and the final result often compromised the success of the best performed operation. Amongst the decided indications for the retro-auricular operation, with the opening of the mastoid, must be considered the cases of cholesteatoma antri, and all cases where symptoms existed pointing to mastoideal pathological conditions or to intracranial complications. Regarding the technique, he preferred the Zaufal-Stacke method.

Dr. NOYES (New York) said while he fully agreed with the advisability of operative treatment for cases where there was any bone disease, he recommended the dry treatment. There was a class of chronic cases in which the acute process might have already considerably subsided, for which the treatment by dry powdered boracic acid was most effective.

Professor KÜMMELL (Breslau) said: "One class of cases has not been mentioned — hysterical girls; they are able to imitate any kind of symptoms. I want to illustrate this by reporting the case of a girl who has been operated upon for the fifth time, and never anything has been found. The skull has been trephined over and over, until there is a defect of the size of the palm of the hand. Her brain has been punctured in at least twenty places. Still, about every six months she becomes ill with the same symptoms; she reproduces all the appearances of dizziness; she shows facial paralysis by contracting the one side of the face or the other; she has temperature up to 40.2° C., or $104\frac{1}{2}^{\circ}$ F. This girl is quite well now, with her over twenty punctures of the brain and seven or ten narcoses."

Professor EEMAN (Ghent), on the subject of opening the mastoid, said that, speaking generally, he was a very warm advocate of the radical operation, but he thought it was a duty in many cases to try *at first, before* performing a radical operation, *all* the other means of treatment.

He particularly wished to direct attention to the cases in which the extraction of the malleus is sufficient to effect a complete and lasting recovery. He said that in his clinic the extraction of the malleus had been performed very often, and with splendid results, about 15 per cent. of the cases being entirely cured. Some of these cases came under treatment with conditions which would certainly have led other surgeons to an immediate and radical mastoid operation, such as fever, intracranial symptoms,

inflammation and narrowing of the external auditory canal, etc. In these cases, under appropriate treatment, inflammation subsided in a few days, and then it was possible to ascertain that there was perforation of the membrane of Shrapnell, and caries of the head of the malleus. Extraction of this ossicle gave a perfect cure; some of the cases had continued under his observation for years after the operation, and he was able to state that the results had been lasting. Professor Eeman desired to warmly advocate the extraction of the malleus in cases of chronic purulent otitis presenting perforation of Shrapnell's membrane and caries of part of the malleus, and the postponement of the radical operation until it had been practically demonstrated that the removal of the malleus was insufficient to cure the patient.

Moreover, he said that he could not agree with the assertion of Schwartz, that isolated caries of the malleus was rare, and that as a rule both incus and malleus were affected at the same time; in his clinic isolated caries of the malleus had been found to be frequent.

Dr. OSCAR BRIEGER (Breslau) expressed himself as follows: Among the indications for radical operation we have included the failure of local medical treatment to produce a cure. According to the present standard of our knowledge this indication will have to be admitted to some degree. But it would be erroneous to deduce that the operation would render subsequent treatment superfluous. On the contrary, after the operative opening of the cavities of the middle ear, the alterations of the mucous membrane, which may become manifest, besides the morbid foci in the bone, may require further local treatment. It is occasionally possible to shorten the after-treatment by combining it with local treatment of the mucous membrane. It is, for instance, advisable in processes which reveal lasting maceration of new-formed or implanted epidermis to plug with gauze soaked in alcohol. Formalin also answers those purposes, as well as combinations with other drugs—for instance, weak solution of nitrate of silver in alcohol—according to the intensity of the process in question.

Luc recommends especially the evacuation of the cavities of the middle ear. If it is to be understood by this that after each radical operation the ossicles ought to be removed, it must be objected that in the interest of the function the preservation of these has been advised. In general this advice is superfluous, because the connection of the columella is in those cases interrupted by

destruction of the long process of the incus. It is quite true that the function is sometimes remarkably good after this, in general, complicated method. But it happens that even after complete skinning over of the cavities of the middle ear foetid secretion continues from carious points of the remaining malleus. And this is less accessible for treatment, and more dangerous, because the local conditions are altered to a variable extent by adhesions, etc. It is necessary, at least, to make careful selection of those cases where the ossicles are to be preserved. With regard to the contraindications of the operation, Dr. Brieger is inclined to exclude meningitis. There are cases where marked symptoms of meningitis are present, and nevertheless there is only circumscribed suppuration, which may heal if new infection from the cavities of the middle ear is excluded by means of an operation; but recovery may take place in spite of diffuse meningitis, as ascertained by lumbar puncture, if the primary centre of infection is destroyed by radical operation, and if by this puncture more favorable conditions are created, recovery may in those cases be effected by removal of the infected material, by the lumbar tapping, or perhaps at the same time by the production of new transudating lymph, which may have some bactericidal property. Of course successes of this kind are rare in extensive meningitis, but are sufficient to justify us in rejecting extensive meningitis as an absolute contra-indication of the radical operation, the more so as the operation itself is harmless in those desperate cases.

Dr. BARR (Glasgow) regretted that the subject of their discussion excluded the methods of operation, and the results of operations, especially the latter, because he thought that one of the most important considerations with regard to the subject was the results of operative measures in chronic suppuration of the middle ear. Probably the most interesting class of cases was that for which there was no immediate demand for operation—cases where there were no objective or subjective symptoms demanding speedy operation. We were indebted to Professor Macewen for uttering a warning about continuing the treatment by the external meatus too long before adopting operation. We must not, however, be too much discouraged by certain dangers from the ordinary treatment referred to by Professor Macewen, such as the removal of granulation tissue or polypi, as the experience of otologists showed that these were not great. Still, it was well that a surgeon of Professor Macewen's vast experience should

utter those words of warning. Although the question of attic treatment had been rather disparagingly referred to by Dr. Knapp, Dr. Barr believed that the attic syringe was of great value, although many of the attic syringes in use were too narrow in the bore. He had found in many cases that after the attic treatment, including the removal of the malleus and incus, and the efficient use of a proper attic syringe, no radical mastoid operation was required.

Professor FARACI (Palermo) thanked Professor Gradenigo for approving of his osteotomy forceps. In the majority of cases he had found the removal of the larger ossicles and the resection of the outer wall of the attic and antrum sufficient. He thought it non-justifiable to open the mastoid as a whole till the ossicles had been removed through the meatus. As regards endocranial dangers there were two categories: (1) If the complication had occurred, the mastoid was a small part of the whole operation. (2) If the complication was only threatening, the operation through the meatus sufficed, as in a case quoted with meningitis symptoms.

His conclusions were that the mastoid should be opened:

1. When it was invaded by the morbid process in whole or in part.

2. When all the other methods of treatment, including the ablation of the larger ossicles and the resection of the outer wall of the tympanic attic and mastoid antrum, had been found fruitless.

3. In cases of manifest intracranial complications, the mastoid operation being followed by the further interference the complications demanded.

Dr. SUAREZ DE MENDOZA (Paris) thought that pain alone was not necessarily an indication for opening up the cavities of the middle ear in their totality. Sometimes in such cases the mastoid was found almost or quite healthy, and the pain was due to eburnation of the mastoid cells. Simple gouging of the mastoid or its erosion by means of an electric burr might be sufficient in such cases. With pain as the sole indication, we might cease operating deeper if the condensation of the bone and the absence of pus or granulations allowed us to attribute the pain to the condensation of the osseous tissue.

Dr. MILLIGAN (Manchester) said that in cases where local treatment had been faithfully tried for a period of twelve months, and where suppuration persisted, he was in favor of performing a

mastoid operation. By local treatment he included the ordinary methods of antiseptically cleansing the parts, the removal of granulation tissue, the removal of diseased ossicles, etc.

Where such methods failed he thought recourse to an exploratory operation justifiable. By its means the paths of infection could be followed up, concealed foci of sepsis attended to, and extension to more deeply seated parts frequently arrested.

He desired to associate himself very largely with the opinions expressed by Professor Macewen.

Mr. T. MARK HOVELL (London) said that the mere fact that a discharge had existed for a long time was not a sufficient reason for the mastoid process being immediately opened up. He considered that the operation should not be undertaken in chronic suppurative inflammation of the middle ear until the ordinary methods of treatment had been fairly tried. About ten years ago he saw a lady who had a discharge from one ear which had lasted for forty-three years. It ceased entirely after about six weeks' treatment by the usual method with an antiseptic lotion and dry boracic powder. The discharge had not returned.

Mr. Hovell was of opinion that when the attic was cleared out the mastoid antrum should be opened at the same time, otherwise a second operation might become necessary.

Dr. C. R. HOLMES (Cincinnati) said he had practised, and was likely to continue to practise, the lines laid down by Professor Macewen. Dr. McBride had said that we could not promise results in mastoid cases. He certainly wished to declare himself against that statement. He believed that in almost every case we could promise the patient a cure. We should save the patient the possibility of two operations when we knew one thoroughly performed would cure.

Dr. DENCH (New York) said each case must be treated according to the local conditions present. When the mastoid process was involved a complete mastoid operation was imperative. If during the operation the surgeon found that infection of the lateral sinus had taken place, he must not hesitate to remove every source of infection. In one of the speaker's cases a second operation was necessary, owing to jugular involvement.

Mr. CRESSWELL BABER (Brighton) thought that most were agreed that in chronic suppuration of the middle ear, accompanied by mastoid symptoms, the bone should be opened. The interesting point to consider was whether the mastoid should be

opened in cases of chronic suppurative otitis media without any symptoms except the discharge. In those cases he considered that, as a general rule, first of all, every means of arresting the discharge through the meatus (such as careful cleansing, curetting, removal of ossicles, etc.) should be tried, and if the purulent discharge from the tympanum still continued, the risks of pyæmic infection from this focus should be put before the patient or his friends, and the possibilities of an operation on the mastoid placing him in a safer position explained, although, of course, no certainty of a cure could be promised until the parts had been exposed by operation, and the full extent of the disease ascertained.

Dr. J. HOLINGER (Chicago) thought that, more or less, they were all conservative in the treatment of chronic suppuration. There was one class of cases undoubtedly where conservatism was absolutely contra-indicated. It was the case following influenza. Whenever in the course of chronic suppuration of the middle ear, no matter how innocent it looked, acute otitis media followed after influenza, we should not lose time with any conservative measures. The only hope was to operate immediately. He wished to emphasize this point.

Mr. P. R. W. DE SANTI (London) said the duration of the discharge in eighteen patients he had had under observation was from six months to fifteen years. On these eighteen patients twenty-six operations had been performed; twenty-four operations he had found to be perfectly successful; in four cases he had followed the teaching of Macewen.

Mr. F. FAULDER WHITE (Coventry) said it would be a deplorable thing if it went out to the profession that otologists in general were all for operations and not for any other treatment.

Dr. LEDERMAN (New York) observed that a conservative method of treatment was generally approved, but that when the discharge resisted treatment for a certain length of time, all agreed that the mastoid should be opened. He inquired what would be a suitable length of time for treatment.

The PRESIDENT regretted that two of the principal papers were not received in time to print before the discussion. He said it was exceedingly difficult to say which cases should be operated upon, but he quite agreed with general rules laid down by Professor Politzer and Dr. Barr. Replying to Dr. Lederman's inquiry, he said that it was impossible to say how long a case should be

continued with the ordinary treatment before settling upon an operation.

Professor MACEWEN briefly replied, and pointed out that he had not said, as stated by Dr. McBride, that in simple discharge operation should be resorted to. That statement had been made elsewhere, and as he had not paid the slightest attention to it, it had been repeated there. He wished it to be made known that it was not correct.

WEDNESDAY AFTERNOON SESSION was devoted to demonstrations in the museum by Politzer, Hartmann, Turner, Joyce, Katz, and others. See bulletin of first session.

Thursday, Aug. 10th.

MORNING SESSION.

Dr. E. J. MOURE (Bordeaux) read a paper on **a case of cerebral abscess consequent on acute suppurative otitis media.**

When the patient presented himself for examination he complained of very acute pain, which had set in on the seventh day of his disease. In addition he had vertigo, depression, no vomiting, no interference with speech, the mind was clear, and the temperature was normal. On the other hand he had homonymous hemianopsia (right), and word blindness with aphasia and verbal amnesia. These symptoms were confirmed by Professor Pitres, who made the diagnosis of cerebral abscess in the neighborhood of the curved convolutions.

In presence of these distinct cerebral complications Dr. Moure operated on the 4th of January, 1899. The bone was congested, the mastoid process being full of fungous granulations right up to the tympanum. The communication between the antrum and the tympanum having been made free it was seen that the roof of the antrum was necrosed and that a small hard sequestrum separated the cavity from the brain. This sequestrum was removed, no pus escaped, and the meninges appeared healthy. As the diagnosis indicated an abscess of the brain situated in the *cuneus* region, an opening was made in the upper part of the temporal bone at about $3\frac{1}{2}$ centimetres above the auditory canal. The opening into the skull measured about 3 centimetres in diameter. The crucial incision was made through the dura mater and the pia mater, producing slight hemorrhage, which was easily arrested

by compression. A fine bistoury was thrust about 3 centimetres backwards and a little upwards into the cerebral substance, but this puncture was immediately followed by as considerable a spurt of blood as if the sinus had been widely opened. Compression with gauze was maintained for some time while the antrum and tympanic cavity were being dressed. When this was finished the cerebral compression was removed, but the hemorrhage recurred so abundantly that it was impossible to continue the operation. A plug of gauze was therefore placed at the opening into the brain, and the hemorrhage was easily arrested in this way.

Next day the general condition was good, the patient talked freely but had paræsthesia, and the general sensibility was almost abolished on the opposite side to the lesion. The right arm was also somewhat paræsthetic.

A few days later the patient was again anæsthetized, the plug was removed and it was then easy to see that the pulsation of the brain was normal. The skin was joined in order to avoid cerebral hernia, and a piece of gauze was left in the brain.

On the 10th of January the sensitiveness had returned, the general condition was good, and there was no fever. Dr. Moure was obliged to be absent for some days and the patient was dressed regularly until the 15th of January when the dressing was found saturated with pus which had run even on to the shoulder of the patient, in fact the cerebral abscess had emptied itself by the orifice made through the brain. The hemianopsia had disappeared. A rubber drainage tube was placed in the cavity. Improvement went on until the 24th of January when the patient complained of the dressing hurting his head, and on removing it a cerebral hernia was found of the size of a small tangerine orange. On the 26th of January the patient became comatose and died suddenly in the evening.

At the post-mortem it was easy to see that there was in fact an abscess which had opened externally and which opened into the ventricle, causing the patient's death. The abscess in fact was found at the level of the curved convolution; but it was not surrounded by a limiting membrane, so that the flow of pus was followed each time by a certain quantity of cerebral material, and hence the ulcerative process which had unfortunately caused the death of the patient.

The case is interesting because of the considerable hemorrhage

which followed the puncture of the brain, and which was probably the result of opening a very congested vein,—a vein which probably accompanied a deep cerebral sulcus. The case is also interesting because of the slight symptoms of reaction which followed this abundant hemorrhage and the consequent plugging. Finally, the case proves once again that abscesses of the brain are always serious when they have no limiting membrane, and that, when in doubt, it is preferable not to make any injections.

Dr. E. B. DENCH (New York) read a paper on **the operative treatment of mastoid inflammation.**

Examination of the statistics of the larger hospitals in New York City devoted to the special treatment of diseases of the ear showed that ten years ago the mastoid operation was rarely performed. During the last few years it has been performed almost daily. Another important fact was, while in former years the treatment of intracranial complications of suppurative middle-ear inflammation was relegated entirely to the general surgeon, at the present day these operations were performed by the otologist. Regarding the indications for opening the mastoid process in chronic suppurative otitis media, it is my opinion that the indications for the operation laid down by Schwartze many years ago were those followed at the present day. The only difference was that under improved surgical technique, by which perfect asepsis was secured, the surgeon did not hesitate to act on these indications immediately. For this reason the number of operations was relatively greater than in former years. If asked to give the signs which seemed to indicate the necessity of operative treatment in this condition, I should name two : (1) Local tenderness over the region of the antrum, and (2) a sagging of the upper and posterior wall of the external auditory meatus close to the membrana tympani. When these signs exist operative interference is always indicated. Experience has shown that the temperature of the patient furnishes but little indication. Spontaneous pain might also be absent although the mastoid might have undergone extensive destruction. Many surgeons regard "tip tenderness" as an important diagnostic point. In my experience it has proven of but little value. Owing to the increased frequency with which the mastoid operation is performed it might be as well to consider any possible dangers which might arise in the operation itself. My own statistics show that out of 228 operations upon the mastoid process in no case could death be attributed to the operation. Where

intracranial complications existed, operative treatment offered the only means of relief. In 13 cases in which thrombosis of the lateral sinus was present, death followed in but 2 cases. One patient died of acute nephritis, which was probably caused by ether narcosis. Where there was an epidural abscess my statistics showed that of 14 cases operated on all recovered.

Regarding the radical operation for the relief of a chronic purulent otitis media with involvement of the mastoid (the Stacke-Schwartz operation), 17 cases have been operated on. Of these 12 were cured and 5 improved. It can therefore be easily seen that the mastoid operation is not in itself a dangerous procedure if the rules of aseptic surgery are closely followed. No operation of this character should be performed without the strictest antiseptic precautions both as regards the field of operation and the instruments, also the surgeon's hand. If proper care was taken, the exposure of the meninges, either in the middle or posterior cranial fossa, or exposure of the opening of the lateral sinus, did not increase in any degree the mortality of the operation. On the other hand, I have found that the more extensive and radical the operation, the better the result. The surgeon who operated most frequently and most radically was really more conservative than he who waited for very pronounced symptoms. Regarding the technique, all details of preparation of the operative field should here be undertaken with strict surgical cleanliness. The primary incision should lie close to the line of auricular attachment and should extend from just below the tip of the mastoid to just above the external auditory meatus, the soft parts being divided down to the bone. In this manner a very narrow anterior flap was formed. The anterior flap was pushed forward by means of a periosteum elevator, exposing thoroughly the superior and posterior margins of the bony external auditory canal. All bleeding points were secured by means of artery clamps. The next step was to sever the attachment of the sternomastoid muscle. This was best done by means of blunt scissors curved on the flat. The tendinous attachment of the muscle should be divided until the finger can be passed beneath the tip of the mastoid into the digastric fossa. In every case the mastoid antrum should be first entered. This applied not only to those cases in which perforation of the cortex was present near the region of the antrum, but also where spontaneous perforation had taken place into the digastric fossa through the internal plate of

the mastoid. For removing the mastoid cortex he preferred either the chisel or the gouge. The bone should first be removed as close to the posterior wall of the bony meatus as possible and not above the spina supra-meatum. The opening in the bone should be gradually deepened until a probe could be passed through the mastoid antrum into the middle ear. The wound should then be explored by means of the probe to ascertain whether the bony walls were intact. After the mastoid antrum has once been entered the topography of the process is evident. The entire mastoid cortex should then be removed by means of the chisel or gouge and the tip removed by the bone forceps. Great care should be taken to thoroughly curette the aditus ad antrum so as to permit free drainage of the middle ear through the posterior opening. Experience has taught me that the operator was inclined to do a less radical operation than was absolutely necessary. In my later cases I have found not infrequently that the bone seemed almost normal. Close inspection, however, revealed the fact that it was a little congested and slightly dark in color. With reference to any possible accidents that might occur during the operation, these were of trifling importance provided aseptic treatment was carried out. I never operate upon a case without expecting to expose or open the lateral sinus or to enter the cranial cavity. The exposure of the sinus in doubtful cases is imperative, and if its appearance is not perfectly normal a free incision should be made into the vessel. No harm could possibly result from this procedure, and many a life which would otherwise be lost might be saved by what was apparently a radical and uncalled-for procedure. The same applies to entering the middle cranial fossa. My own cases which have terminated fatally have been those in which I had not done a complete and radical operation.

Dr. KNAPP (New York) : Do you attach the same importance to tenderness on pressure in acute cases as in chronic? Dr. Dench replied in the negative. (From *The Laryngoscope*.)

Dr. DELIE (Ypres) read a paper on **panotitis; cerebral complications; death; post-mortem.**

A patient, aged forty, presented all the symptoms of chronic inveterate neuralgia of the right trigeminal. Deafness declared itself, and was found to be due to an exostosis of the right external auditory canal. An operation restored his hearing but produced no change in the right hemicrania. A few days later

symptoms of acute mastoiditis declared themselves, accompanied by vertigo, and a hardly perceptible otorrhœa. A Stacke's operation showed the only lesions to be purulent infiltration of the external wall of the apophysis and a small polypus in the attic. The patient died comatose a few days afterwards.

At the post-mortem examination the following lesions were discovered :

A purulent infiltration in the bony roof of the right middle ear. Symptoms of acute meningitis limited to the anterior surface of the bulb, spreading from the side of the affected ear to the inner third of the cerebellum, and compressing on the left side all the meninges which covered the left side of the cerebellum. There was pus in the fourth ventricle, and in the left lateral ventricle. The left ear was free of any pathological lesion, and the same could be said of all the other parts of the endocranium and its coverings, as well as of the bony skull.

MR. A. H. CHEATLE (London) read a paper on **the petro-squamosal sinus—anatomy and pathological importance.**

As little or nothing is written in even the best works on otology concerning this sinus, which has most important connections with the middle ear both from anatomical and pathological stand-points, I have thought the subject of sufficient interest to bring before the Congress. The following British authors have written on the subject: J. F. Knott, of Dublin (*Journal of Anatomy*, vol. xvi., page 27), who quotes C. Krause, Luschka, Otto, and Sir Charles Bell; Henry Morris (*Anatomy*, page 661), Professor Macewen (*Pyogenic Diseases of the Brain and Spinal Cord*, pages 2 and 8), and Quain (*Anatomy*).

COMPARATIVE ANATOMY.

In some lower animals, dog and calf for instance, this sinus runs across the roof of the middle ear, making its exit by means of a large foramen between the base of the zygoma and the bony meatal wall, and serves almost entirely for the exit of the intracranial blood, taking the place in fact of the sigmoid portion of the lateral sinus.

In the higher forms of monkeys, such as the chimpanzee, gorilla, and orang-outang, the sinus closely resembles the human.

In the *Macacus* group the young often have the groove which runs along the petro-squamosal suture, and the anterior external opening well marked; while with the adult the opening is usually

closed or rudimentary, leaving the groove which runs forward to the foramen spinosum. In other varieties, notably in Baboons, *Chrysotrix*, *Cebus*, *Midas*, *Hapule*, *Lemuridæ*, and *Indri*, both the groove and the external opening are well marked, the latter piercing the bone between the large post-glenoid tubercle and the bony meatus. In these the sinus does not take the place of the sigmoid portion of the lateral sinus, as it is also present and well marked.

HUMAN ANATOMY.

. In early foetal life, before the formation of the internal jugular vein, the petro-squamosal sinus carries all the intracranial venous blood, emerging in front to open into the primitive jugular (afterwards the internal jugular). It is not to be wondered then that this channel which serves such important duties in early foetal life should persist in some form or another in later life. The anterior opening usually closes, the sinus or its remains at its anterior extremity forming a connection with the middle meningeal vein. The sinus dwindles to a small size, while the opening into the lateral sinus often persists.

With regard to the persistence of the anterior opening in front of the meatus in adult life, I examined 2585 skulls in the Royal College of Surgeons' Museum, and among this number I found in 23 rudimentary remains, 3 in the glenoid cavity, 3 in the zygomatic process itself, 6 in the base of the zygoma, and 11 just external to the Glaserean fissure, with sometimes a fine groove running outwards and occasionally bridged over by the junction of the post-glenoid tubercle with the bony meatus. I must here say that it is the rule rather than the exception for remains of the sinus to be present in some form or another all through life. In this statement I am supported by my friends, Mr. Arthur Keith and Mr. Cadman. Unfortunately it is impossible in the time allowed me to describe minutely the different varieties, but in the photographs to be shown directly some idea can be obtained, and some specimens of my own are now in the Museum.

In infancy and childhood the sinus as a rule had a well-marked opening into the lateral sinus behind by means of a valve-like opening, and in front joining the middle meningeal vein, while in adult life, although it is often marked, careful search has sometimes to be made. The absence of markings on the bone in the neighborhood of the suture does not by any means show that the sinus is not present. In infancy and early childhood, in the region

of the posterior extremity of the suture, numerous irregularities are often seen ; it is at this spot that a bridge often forms over the posterior end of the sinus before it opens into the lateral sinus, a common condition in the adult bone. I will now show photographs of a few specimens in my collection.

(A series of excellent photographs demonstrating various phases of the sinus were thrown on the screen.)

On looking at the roof of the middle ear in a fresh specimen after the *dura mater* had been stripped off, a network of rather large veins can be plainly seen immediately beneath the bone ; from this network several veins emerge through the suture to empty into the sinus.

In children in which the interval between the suture is wide these are sometimes numerous, especially posteriorly. In the adult a fairly constant one is present on a vertical level with the membrane ; or more may be present at intervals. These emerging veins receive a fine covering representing the meninges.

Occasionally the openings of fairly large veins can be seen on the cerebral side of the sinus, especially at its anterior part.

PATHOLOGICAL IMPORTANCE.

It is therefore seen that there is a connection between the veins of the middle ear and those of the meninges, and occasionally, at all events, with those of the temporo-sphenoidal lobe, and through the meningeal coverings the middle ear is in communication with those of the middle and posterior fossæ. Under these circumstances the importance of this sinus, with its tributaries and connections, from a pathological point of view, is very evident, and explains how infection may spread from the middle ear to meninges and brain without microscopical evidence of the connection. Such a state of things is not uncommon, as we all know, in infants and children, in whom, as I have said, the pathway we are considering is well marked and in whom the membrane may be intact. There is a specimen of mine in the Museum, obtained in the post-mortem room from an infant, aged one year, who died of suppurative lepto-meningitis, without a known cause, during an attack of pneumonia. The middle ear was full of pus containing all sorts of pathologic cocci. I cut sections of the emerging vein but was unable to find cocci, but this by no means precludes this as having been the pathway. There was no thrombosis. This is by no means the first case of the sort I have seen.

Occasionally it is seen in adults, but as a rule a perforation is present in the membrane. It is astonishing, in the face of this close connection of the middle ear with the meninges, that meningitis is not of more frequent occurrence. The explanation may be that the meninges, like the peritoneum, are able to deal with a certain amount of infection, and only when the dose is excessive is this resisting power overcome. This pathway will also explain the presence of a cerebral abscess without microscopical connection with the diseased middle ear. That the sinus may be the pathway for septic thrombosis of the lateral sinus I have evidence in two cases.

A. H. Cleveland, of Philadelphia, in the *ARCHIVES OF OTOTOLOGY*, col. xxiv., p. 136, 1895, relates the case of a boy, aged six years, who died of pyæmia. At the post-mortem the petro-squamous sinus was found abnormally large and deep, being at one or two points almost entirely bridged over by bony processes. At its anterior extremity necrosis had taken place and pus had entered the sinus, causing a thrombus which extended backwards into the lateral sinus. Meningitis was present on the same side.

In St. George's Hospital Museum, and now in our own, is a specimen (No. 33a) of the dura mater, with the lateral and longitudinal sinuses, from a man aged twenty years who, after suffering with discharge from the right ear for three months, died with symptoms of meningitis. At the post-mortem examination suppurative meningitis was found over the right side, with septic thrombosis of the lateral and longitudinal sinuses. A vein was found which made a direct communication between the tympanum and the lateral sinus and which would admit the passage of an eye probe.

It may be that we have here one of the pathways which will solve some of the unaccountable intracranial affections met with by the physician, such as the posterior basic meningitis of infants, cerebro-spinal meningitis, and perhaps some cases of tuberculous meningitis, especially when the lining membrane of the middle ear is like the following photograph (shown).

It is taken from a section of the lining membrane of the middle ear of an infant who died of tuberculosis meningitis and general tuberculosis. Tubercle bacilli can also be seen in another section (to be seen in the Museum).

I should like to draw attention to the condition of the middle ears of children who have died of general tuberculosis, including

meningeal tuberculosis. There is thin, purulent matter in the cavity, often with an intact drum, irregular thickening of the lining membrane, which on section shows patches of well-marked infiltration, but no tubercle.

In conclusion, I wish to give my best thanks to the Council of the College of Surgeons, to Prof. Chas. Stewart, F.R.S., and Mr. Arthur Keith.

Dr. KNAPP (New York) said that he was sure he was speaking the sense of the convention if he expressed his most hearty thanks to Dr. Cheatle, not only for the instructive demonstration and his important remarks on the petro-squamosal sinus, but also on his untiring efforts in bringing about such a unique otological museum, which they had all admired and studied with keen interest. His attention was first drawn to the significance of the petro-squamosal sinus by the case of Dr. Cleveland, of Philadelphia, which Dr. Cheatle quoted, and of which Dr. Cleveland had sent the speaker his manuscript, with the remark that in text-books of aural surgery, and also in those of descriptive anatomy, nothing, or almost nothing, was to be found on the topic. He looked up the subject and found only a short but very good description (about 15 lines small type) in Quain. Now that authoritative attention had been directed to this sinus we may expect to hear more about it. He felt sure that by its knowledge we should be able to understand many symptoms in vivo and at autopsies, which thus far had been obscure. (From *The Laryngoscope*.)

Professor V. GRAZZI (Florence) read a paper on **a new treatment for chronic catarrhal inflammations of the pharynx connected with diseases of the ear.**

After referring to the frequency of chronic catarrhal pharyngitis and the inefficiency of all the methods hitherto proposed for its treatment, the author discussed the varieties and different degrees of the affection. He presented some microscopic preparations in order to show the normal structure of the pharynx and the alterations produced in it by chronic catarrh with hypertrophy of the adenoid tissue. He remarks that the structure of the pharynx itself suggested to him the method of treatment under consideration,—a method which consists in the compression or crushing of the diseased tissues. Consequent on these manœuvres, repeated more or less frequently, the tissues become less inflamed, the granulations are absorbed, the function of the glandular tissue is re-established, as well as the circulation in the blood-vessels and lymphatics.

Professor Grazzi carries out this treatment by means of small metal probes, bent at an angle more or less obtuse; the small probes end in a kind of fork into which are fixed small rollers. These are pressed up and down on the pharynx with more or less force, according to certain indications mentioned by Dr. Grazzi, and have been found very useful in certain cases where the disease had spread to the middle ear. The instruments were demonstrated at the congress.

Dr. ARISTIDE MALHERBE contributed an elaborate paper on the **surgical treatment of dry chronic middle-ear inflammation by scooping out the petro-mastoid bones**, published in pamphlet form. Paris, 1899.

Dr. LOUIS BAR (Nice) read a paper on **the diagnosis of anterior abscesses of the mastoid, and of furunculosis of the external auditory meatus**.

Otologists are agreed that they sometimes find it difficult, if not impossible to make a diagnosis between abscess of the limiting cells of the mastoid process and furunculosis of the meatus externus. In such cases a reasonable diagnosis can only be made from deductions drawn from a perfect acquaintance with the anatomy and physiology of the region and at the same time from the general aspect and progress of the case. The following deductions may be drawn :

I. That lymphangitis and early periauricular adenitis are the rule in all furuncular affections of the meatus; and are late and exceptional in purulent inflammations of the limiting cells. This is consequent on the difference between the lymphatic systems of the external and middle ear.

II. That perimastoid œdema effaces the retro-auricular depression in furunculosis, whereas in mastoiditis the retro-auricular depression persists and remains circumscribed.

III. That the pharyngeal plexus may become visible through venous stasis induced by the mastoiditis.

IV. That, in consequence of the different innervation of the tympanum and the meatus, spontaneous pains and sensitiveness are more acute in furunculosis; they are less marked in general in anterior abscess of the mastoid.

V. That, also for neurological reasons, in inflammation of the anterior cells, facial palsy is sometimes observed, an exaggeration of gustatory sensitiveness, and particular sensitiveness of the pharynx and end of the tongue.

VI. That the bacterial nature of the pus is different in the two diseases.

VII. That in absence of any febrile condition a continuous disproportion between the pulse and the temperature is in favor of mastoiditis.

Dr. LANNOIS (Lyons) contributed a paper on **epilepsy of aural origin**.

Dr. Lannois gave the history of a patient aged twenty-six, of tuberculous inheritance, but without any pulmonary symptoms, who was attacked with double otorrhœa at the age of seven, and epilepsy at the age of thirteen. When he presented himself for treatment in April, 1897, he had, as a rule, an epileptic attack every week. One ear had cicatrized, and had been dry for some time. The other ear was still suppurating, the drum entirely destroyed, cicatrizing in part, but with two ulcerations below and in front. Cure was obtained in a few weeks, and the hearing for the watch, which had been only on contact, improved twenty and twenty-five centimetres. At the same time the epileptic attacks disappeared, and in March, 1899, the patient returned of his own accord, to say that he had remained cured since, and that his ears were quite dry. During the year 1898, he had had only two slight attacks of vertigo,—the last being in the month of August.

Cases like this, where the connection between the otic lesion and epilepsy appears well marked, are very rare. It is this fact that gives interest to the above case, and shows the importance of treating the ears when they are affected in epileptics.

MR. GALBRAITH CONNAL (Glasgow) contributed a case of **sarcoma of the external auditory canal**. (Photographs of the patient and sections of the tumor were shown in the hall of the Congress Museum.)

Malignant tumors of the ear are rarely met with. Of the two forms of malignant disease, sarcoma of the ear is more uncommon than carcinoma. On looking over the statistics of the Glasgow Ear Hospital for the past twelve years, I find that in an aggregate of nearly 15,000 cases malignant disease is noted as occurring six times,—once in 2500 cases,—four times epithelioma, and twice sarcoma. These figures nearly agree with those of Bürkner, which are often quoted. More recently Asch, in 1896, in reporting a case of sarcoma of the auricle, mentioned that he had found only ten cases of sarcoma of the ear described in literature.

Of the two cases of sarcoma which have occurred at the Glasgow Ear Hospital, one was reported by Dr. Barr in the *British Medical Journal* for October, 1897; the second is the case which I have the honor of submitting.

These two cases were in marked contrast in the way they developed. In Dr. Barr's case, where the sarcomatous mass originated in the middle ear, there was no external growth, and the symptoms latterly pointed to some intracranial mischief suggesting temporo-sphenoidal abscess. In the present case, where the sarcoma originated in the external auditory canal, the development of the tumor was outwards, and gave rise to a large swelling in front of and behind the ear.

The patient was a girl six years of age. About eight weeks before she came to the hospital, her mother noticed a small growth — said to be quite painless — in the external auditory canal. A portion of this growth was removed by the family medical attendant, but it quickly recurred, and afterwards pain was persistent and severe. Facial paralysis set in seven days later and persisted. There was no history of purulent discharge from the ear.

Inspection showed a grayish-looking mass occupying the external meatus. It was exceedingly painful to the touch, and with the probe it was found adherent along the posterior wall of the canal. There was slight matting of the tissues in front of the ear over the parotid, and the gland at the angle of the jaw was enlarged. As already mentioned, there was marked facial paralysis on the same side.

Under chloroform the whole mass was curetted from the wall of the canal. The tympanic membrane was found destroyed, and the bone on the inner wall of the tympanum denuded of periosteum. This gave relief from pain; the patient slept well, and put on flesh. But in about a month's time the growth recurred, and rapidly involved the mastoid region and the tissues in front of the ear. The great involvement of these regions by the extension of the tumor outwards is seen from the photographs.

The patient died seven months after her first visit to the hospital. No post-mortem examination was allowed.

Sections of the tumor showed a spindle-celled sarcoma, with the sarcomatous growth extending along underneath the epidermis.

These malignant tumors of the ear, though rare, are very

interesting. A point of practical importance lies in the diagnosis. As we know, sarcoma is apt to manifest itself in the earlier years of life, at a time when we often meet with polypi and granulations in the external auditory canal as the result of neglected purulent otitis media. Excessive pain should always excite suspicion of malignant mischief, and lead to a microscopical examination of the tissue. So far as I have examined the literature on the subject, excessive pain is the prominent symptom. If in addition to pain there is marked and rapid recurrence of the growth, with glandular involvement, we have a group of symptoms which should make one careful as to the diagnosis and prognosis.

In the present case the excessive pain, and — what was very marked — the grayish look of the tumor, which was unlike ordinary granulations, the intimate adherence of the tumor to the posterior wall of the external auditory canal, the matting of the tissues in front of the ear, the glandular involvement, and the facial paralysis — these, apart altogether from the history of the case, presented a clinical picture which at once arrested attention, and led to a microscopical examination of the tissue being made, when the diagnosis of sarcoma was confirmed.

Dr. RUTTEN (Namur) showed an **exostosis of the right auditory meatus**.

The osseous anomaly was remarkable for its large size. It measured fifteen millimetres in length, and twelve millimetres in thickness. It filled the external meatus so completely as to prevent the introduction of the smallest probe between the cell and the tumor. Besides, by its compressure, the excrescence had destroyed the skin and caused an osteo-periostitis of the canal. This secondary suppuration complicated by the retention of pus in the middle ear with the commencement of cerebral symptoms, compelled the patient to let himself be operated upon.

The exostosis is remarkable, in addition to its extraordinary size, for the long time it had been in the ear without causing any trouble. Its slow development had taken place unperceived. The patient was thirty-eight years of age at the date of the operation; he was a cooper by occupation, had served in the army and had never suffered from running from the ear. Seven years before the operation he had consulted Dr. Rutten for deafness. At that time the exostosis already completely obstructed the meatus, and the patient was much astonished when he touched with his little finger a hard body which was only distant a few

millimetres from the entrance of the ear. He had never suspected its presence. At that date the operation proposed was declined, although the dangers of suppuration were pointed out,—complications which, as a matter of fact, set in seven years later. One might therefore safely say that the tumor had been fifteen to twenty years in developing.

The exostosis, of the consistence of ivory, was pedunculated. It was covered with a thin, transparent skin, and was implanted on the postero-superior wall, occupying the whole bony part of the canal. Under an anæsthetic it was removed with the gouge, without turning down the auricle. The result of the operation was immediate restoration of hearing and cure of the otorrhœa.

P. LACROIX (Paris) read a paper on **otitic complications of ozena (ozena of the ear)**, in which he first reports the case of a girl suffering from acute otitis media in whose ear, after paracentesis, he found the characteristic secretion of ozena—that is to say, a liquid matter in which were little crusts presenting quite the special odor of ozena. This is obviously a case of ozena of the ear.

The author next gives the result of his researches in forty-two cases of ozena. In thirty patients he found lesions of the middle ear. It should be added that, under such circumstances, a careful examination of the ear is necessary.

Finally, the author concludes that the otitic complications of ozena are very frequent and deserve the name of *ozena of the ear*.

(From *The Laryngoscope*.)

Prof. OSTMANN, of Marburg, Germany, speaks on his **therapeutic results with vibratory massage in chronic hardness of hearing**. He uses a massage apparatus, moved by electricity, of Hirschmann, Berlin. The external auditory canal is closed air-tight by the end piece of the apparatus. The to-and-fro movement of the piston is 2 mm, and imparts 1000 to 1200 puffs on the drumhead in ten minutes. No unpleasant reaction follows. Thus far he has tried this mode of treatment in four cases, which he details. Results: the objective condition unchanged; tinnitus was never increased, but gradually diminished, yet it disappeared in no case, though it did not return in its former intensity; the range of audition—lower- and upper-tone limits—was in several cases perceptibly widened. Ostmann considers his communication not as something definite, but as an invitation to collective scientific labor, in order to find more

surely and quickly the granule of gold which seems to inhere in this mode of treatment. He deems the method indicated in chronic hypertrophic otitis media catarrhalis and in protracted cases of hardness of hearing left after acute otitis media.

(From an abstract of the author, with a plate indicating the examination of the hearing function before and after the treatment, in the *Zeitsch. f. Ohr.*, xxxv., p. 287.)

TH. HEIMAN, Warsaw. **Primary inflammation of the mastoid process.** The speaker has very rarely met with cases of primary periostitis of the mastoid, and never has he seen a case of idiopathic inflammation or suppuration limited to the mastoid cells. The cases of primary periostitis which led to a subperiosteal abscess were always caused by traumatism, once only by erysipelas. Those cases which did not produce abscesses, but disappeared by absorption, or left a thickening of the periosteum (hyperplasia), were caused by traumatism, colds, syphilis, or gout. A certain number of cases, looking like primary ones, manifested themselves later as originated in suppurations of neighboring structures. He details three cases of purulent mastoiditis where the middle-ear affection was so insignificant and transient that it might readily have been mistaken for primary mastoid suppuration.

(From the paper published in full in the *Annales des mal. de l'oreille*, etc., Nov., 1899, p. 475.)

Dr. F. ROHRER, Zurich. **The blue coloration of the drum (tympanum cœruleum) and the formation of varices in the drum membrane.** Rohrer describes the color of the normal tympanic membrane at different ages, speaks of the blue aspect which in rare cases is noted in the lower part of the drum membrane when by dehiscence of bone at the floor of the tympanic cavity the jugular bulb projects into the latter. R. then details a case observed by him these five years where there were from one to four blue nodules on the posterior surface of Shrapnell's membrane, appearing and disappearing from time to time. They were true varices.

(From *Annales des mal. de l'oreille*, etc.)

Dr. LOUIS BAR, Nice. **Differential diagnosis between anterior mastoid abscess and furuncle of the ear canal.** Bar relates four incident cases, and then discusses the differential diagnosis between the above affections. He particularly and justly advises us to rest our judgment chiefly on the anatomy of

the parts. The anterior mastoid abscess is commonly accompanied by perforation of the drum membrane and otorrhœa, the swelling is in the deepest part of the canal, the mastoid itself is painful and sensitive to pressure; commonly there is rise of temperature at the onset, later no fever; the course is slow. The furuncle effaces the retro-auricular furrow, the mastoid abscess does not materially change it. Lymphangitis and preauricular adenitis are usually early symptoms of a furuncle, whereas they are either absent or little conspicuous in anterior mastoid abscess. Dr. Bar says that Lubet-Barbon and Broca¹ have nicely traced the symptomatology of anterior mastoid abscess, but he thinks that the differential diagnosis between it and the furuncle is frequently quite difficult, if not impossible for a time.

Dr. MARCEL LERMOYEZ, Paris, makes some remarks on the **infectiousness of acute suppuration in the middle ear.**

A woman, nursing her husband during grippe which was complicated with a mild acute otitis, is affected in the same way. Two sisters with herpetic angina suffer from acute otitis media alike. Two other sisters are affected simultaneously with measles, otitis, and adenitis. Two children had a mild attack of grippe complicated with otitis and tympanal ecchymosis. A brother and sister, doing farm labor, were sick with hemorrhagic otitis. A lady was affected with bilateral hemorrhagic otitis during mild influenza, her nurse in the same way two days later. A chambermaid had otitis, a young man who was about her contracted otitis of the same kind four days later.

Lermoyez is of opinion that a healthy person coming in contact with a man suffering from otitis may catch the disease. In Paris hospitals observations have been made which seem to confirm his supposition. In the Hôpital des Enfants Malades about 20 per cent. of the children were attacked with otitis, whereas in the private practice of the attending physician only 1 per cent. Similar observations were made in other hospitals. The transmitted otitis has the same form as the primary. Lermoyez concludes that persons, especially children, suffering from otitis should be isolated.

Dr. GARNAULT, Paris, speaks on the **mobilization of the stapes.** A man, seventy-two years old, who had been hard of hearing forty years, completely deaf fifteen years, received considerable improvement from mobilization of the stapes, which has

¹ *Les suppurations de apophyse mast., etc.*, p. 62.

continued these three years. Speaks of other equally favorable cases, and presents a lady patient in confirmation of his statements.

Dr. FISCHENICH, Wiesbaden. **The treatment of catarrhal adhesive processes in the middle ear by injections of pilocarpin.** Fischenich used the remedy in a 20-per-cent. solution in increasing doses in the various sclerosing processes with or without labyrinthine complications. In 120 cases during the last four years the results have been encouraging, and he urgently recommends this treatment. The remedy must be introduced directly into the drum through the tubes. From thirty to fifty applications are required. He states: 1. At the beginning a certain degree of improvement of hearing is obtained. Then the capacity of the mucous membrane for absorption mostly diminishes. 2. A further improvement of hearing can be obtained by a repetition of the treatment at a later period. 3. After total cessation of all treatment improvement may still be noticed.

No reports have been obtained of the papers of Drs. GOLDSTEIN, EEMAN, FARACI, NUOLI, SNOW, MINK, BRIEGER, HARTMANN, COSTINI, and AVOLEDO, whose papers are mentioned in the general synopsis, at the first part of this report.

REPORT ON THE PROGRESS OF OTOTOLOGY DURING THE SECOND QUARTER OF THE YEAR 1899.

COMPILED BY DR. A. HARTMANN.

Translated by Dr. HERMAN KNAPP.

ANATOMY OF THE EAR.

107. BRÜHL, Z. Radiographs of the cavities of the ear and nose. *Arch. f. Ohr.*, Bd. xlv., S. 117.

108. OKADA. On the surgical anatomy of the ear. *Arch. f. klin. Chir.*, Bd. lviii., Heft 4.

109. PREYSING, HERM. The healthy human tympanum is germless. (From the Pathological Institute of Breslau.) *Centralbl. f. Bact.*, etc., Bd. xxv., Nos. 18, 19.

107. BRÜHL describes drawings of temporal bones and the accessory cavities of the nose, which had been particularly prepared for Roentgen photographs. The method has been fully described in a previous publication of the author ("The Methods of the Anatomical Presentation of the Cavities of the Ear and Nose." In German). It is a pity that the pictures of Brühl could not have been better reproduced. BLOCH.

108. OKADA draws from the large number (111) of openings of skulls at the Berlin Anatomical Institute the following conclusions :

1. Anthropological forms of skull give no sure indications of "dangerous temporal bones."

2. Dangerous temporal bones are met with more frequently on the right side and with small mastoid processes than on the left side and with large mastoids. In the dangerous mastoids ("Proc. mast. infantiles") the mastoid planum forms a very obtuse angle

with the axis of the ear canal. Their diagnosis is further facilitated by (a) the medial position of the spina supra meatum, (b) youthful age (up to thirteen years), (c) female sex. BRÜHL.

109. PREYSING found the contents of the normal tympanic cavities of 69 aseptically opened fresh cadavers germless in 62 cases. The 7 infected ones were not free from suspicion of a previous infection. The tympanic cavities filled with mucus of new-born children, as well as serous exudate (in general dropsy), have equally proved germless. In the acute purulent otitis media of a typhoid patient the author has found typhoid bacilli in the pus. BRÜHL.

PHYSIOLOGY OF THE EAR.

110. SCHWENDT, A., Basel. Experimental determinations of the wave lengths and numbers of vibration of the highest audible tones. *Arch. f. d. ges. Physiologie*, Bd. lxxv.

110a. STUMPF, CARL. Contributions to the acoustics and science of music. No. 2. Leipzig, 1898. Price Mk. 5.

111. HENSEN, V. On the acoustic motion in the labyrinth water. *Münch. med. Wochenschr.*, 1899, No. 14.

110. According to Kundt's methods of dust-figures and their photographs, SCHWENDT ascertained as the normal limit of audibility for high tones :

1. With König's tone-rods $f^{\sharp} = 20,480$ v. d.
2. " " tuning-forks $f^{\sharp} = 21,845$ v. d.
3. " " Galton whistle $f^{\sharp} = 21,845$ v. d.
4. " Edelmann's " $a^{\sharp} = 27,361$ "

The alleged g-sharp ⁸ of Appun (50,880) has only from 10,000 to 11,000 v. d. (f^{\sharp}). Instruments that give 40,000 v. d. have thus far not been constructed, nor can tones of that pitch be heard.

BRÜHL.

110a. C. STUMPF and M. MEYER publish in the above monograph of 170 pages five papers, partly on the physics of music, partly on the physiology of the ear, based altogether on physiological investigations. In the first, Stumpf critically reviews some recent investigations on tone-fusion (Tonverschmelzung). He understands by tone-fusion the unity of sensation produced by the impression of compound tones, such as octaves, fifths, thirds. All observers agree as to the gradual diminution of tone-fusion in the just-named succession. Max Meyer, "On the Theory of

Difference-Tones and on Sensations of Sound in General," is satisfied that the difference-tones are subjective of origin, *i. e.*, produced by a function of our hearing organ.¹ He criticises Ebbinghaus who adheres to Helmholtz's resonance theory and supplements it. Meyer thinks it would be better to give up the theory of resonance altogether because it handicaps the progress of physiological acoustics. He does not want to prop this theory up by explaining, according to it, Bezold's investigations on deaf-mutes. Meyer rests his theory of audition on the supposition of an analysis of the masses of sound in the labyrinth by the differences in the intensity of motion.—To report on the other papers would be out of place in these ARCHIVES.

BLOCH.

GENERAL SUBJECTS.

a.—REPORTS AND GENERAL COMMUNICATIONS.

112. BARTH, Prof. A., Leipzig. On the present status of laryngology, rhinology, and otology. Introductory address to his professorship at the University of Leipzig. Leipzig, 1899.

113. WASSMUND, Dr., Military Surgeon. Report on the Ear Department at the Military Hospital I. at Berlin, for the time from Oct. 1, 1896, to Oct. 1, 1898. *Deutsche militärische Zeitsch.*, Heft 6, 1899.

112. BARTH gives a very opportune and comprehensive presentation of the above specialties, with the view that they should receive due recognition in the curriculum and examination of the German student of medicine. The three departments might be taught by one man, who should have a salaried professorship with seat and vote in the faculty, as well as the necessary institutions and assistants for didactic and clinical teaching.

113. The Ear Department of the Berlin garrison has 35 beds and one examination room. According to WASSMUND, during the two years, 459 patients were admitted, 448 for diseases of the ear, and 11 for diseases of the nose; 17 openings of the mastoid, 6 radical operations, and 2 openings of the lateral sinus were made.

b.—GENERAL SYMPTOMATOLOGY AND PATHOLOGY.

114. GUYE, A. On agoraphobia in relation to ear disease. *The Laryngoscope*, April, 1899.

¹ Compare these ARCHIVES, ix., pp. 56, 57.

115. BURNETT, CHAS. H. Further observations on the mechanism of aural vertigo and its relief by removal of the anvil. *Am. Journ. Med. Sciences*, April, 1899.

116. EGGER, L. Du réflexe binauriculaire, *Ann. des mal. de l'oreille*, etc., 1899, No. 6.

117. LYMES, J. A. The bacteriology of some suppurations complicating pulmonary disease. *Bristol Medico-Chirurgical Journal*, March, 1899.

114. GUYE refers to Lannois and Tournier, in Lyons, who published, some months ago, ten cases of agoraphobia in which various forms of ear disease seemed to be the cause of the neurosis. In three of these cases they saw the agoraphobia disappear after the successful treatment of the ear disease. Guye reports two cases of this disease occurring in connection with disease of the ear. He thinks that in this neurosis the condition of the ears should be investigated.

GORHAM BACON.

115. In this paper BURNETT refers to twenty-seven cases of ear vertigo in which he liberated the stapes by removing the incus, and in which entire freedom from incapacitating attacks of ear vertigo followed the operation. This relief did not always come at once, as long a time as six months having elapsed in some instances before entire relief was obtained. In a few cases the tinnitus was entirely relieved and in the rest of the cases greatly diminished by the operation. The hearing was uninfluenced by the operation.

Burnett reports further a case of mumps affecting both sides and occurring in a healthy man. The left testicle was affected and several days later he had an attack of pleurisy on the right side. The patient complained of shooting pains in the left ear, tinnitus and deafness on the same side. As soon as he was able to leave his bed, he had attacks of vertigo. The apparent motion of objects was always toward his left side with a tendency at times to reel and fall toward his left. Preceding any vertiginous attack there was an increase of tinnitus in the left ear and usually a coppery taste in his mouth.

For about a year following, the vertigo continued until Burnett removed the incus, when the vertigo disappeared.

GORHAM BACON.

116. EGGER supposes that in one of his two cases a plug of cerumen in the left ear was the cause of tinnitus and hardness of hearing not only in that ear but, by the way of reflex through irritation of the tympanic membrane and the sensitive nerves of

the meatus, also in the other (right) ear, for on removal of the plug the symptoms disappeared in both.

In the other case, the binaural reflex did not occur in the ear in which there were scars and absence of the anvil from old supuration, where consequently the action of the tensor tympani was eliminated.

ZIMMERMANN.

117. An extremely valuable paper of great interest to otologists was read by LYMES at a meeting of the Bristol Medico-Chirurgical Society on February 8, 1899. In dealing with cases of pneumonia in which one or more foci of suppuration are found in other parts, attention is drawn to, and cases are related of, implication of the middle ear. From Lymes's observation the ear trouble may : (i) be secondary to pneumonia, causing cerebral symptoms, the pus in the tympanum containing pneumococci, and be entirely overlooked, especially in children ; or (ii), may apparently be the origin of the lung trouble, without local signs of extension of disease from the tympanum, or in which suppurative cerebral and spinal meningitis, or foci in other parts, may also be present, the infection in all situations being either due to staphylococci, streptococci, or bacillus coli.

ARTHUR CHEATLE.

C.—METHODS OF EXAMINATION AND TREATMENT.

118. BREITUNG, M., Coburg. Some remarks on the practical use of Gellé's experiment. *Monatschr. f. Ohren.*, 1899, No. 6.

119. BING, ALBERT, Vienna. On Gellé's experiment. *Ibid.*, 1899, No. 4.

120. TEICHMANN, Berlin. On a uniform presentation of the results of the examination of hearing. *Ibid.*, 1899, No. 5.

121. BONNIER, P. Un procédé simple d'acoumétrie. *Arch. internat. de laryng.*, etc., vol. xii., No. 2.

122. COURTADE. Recherches sur la simulation de la surdité unilatérale. *Ibid.*

123. LIEBIG, G. VON. Treatment of ear disease in the pneumatic cabinet. *Münch med. Wochenschr.*, 1899, No. 20.

118. BREITUNG has found that more or less pressure has to be exerted in order to obtain a positive result from Gellé's experiment, owing to differences in the conditions of the drum membrane and ossicles. Light pressure suffices where the middle-ear apparatus is very elastic, otherwise stronger pressure has

to be exerted, and even this is insufficient in marked changes, and the result is negative. He thinks that these differences are of prognostic value.

119. BING opposes some of the statements of Bloch, calling to mind that a negative result of Gellé's experiment is proof of an impediment in sound conduction, but its practical value is far less than that of Rinne's experiment. The requisite air pressure influences the ear in such a way as to make it difficult to distinguish whether a given tone becomes stronger or not.

120. TEICHMANN's diagram deserves preference over the symbolic otological annotations, and affords a quick and convenient comprehension of the results of the functional examination of hearing.

121. To obtain a uniform and comparable foundation for the functional examination of the ear, BONNIER proposes to use a tuning-fork of 100 v. d. and note the time at which the visible vibrations of the fork begin to disappear. The ear examined hears the fork until so and so many seconds before or after that time.

122. COURTADE uses a binaural hearing tube constructed like the popular binaural stethoscope. The free ends of the (elastic) tubes are put into the patient's ears; the common tube ends in a funnel-shaped sound-receiver, before which a deep-sounding tuning-fork is held. Unobserved by the patient, the elastic tube of the sound ear is compressed. If the patient continues to hear the sound he is a malingerer. This test is a modification of one first recommended by Dr. Coggin, of Salem, published in the ARCH. OF OTOL., vol. viii., p. 177, in 1879, and several others, have since been made known. TRANSLATOR.

123. V. LIEBIG, bacteriologist in Reichenhall, collects the publications relating to the cure of deaf-mutes by the pneumatic cabinet, one of which has recently been added to the therapeutic resources of Reichenhall. The results mentioned are "marvellous," but unfortunately communicated by Liebig without any criticism. They read like the advertisements in secular papers—35 per cent. of perfect cure, among which are cases of chronic suppuration, polypi, and exostosis. SCHEIBE (Münich).

d.—DEAF-MUTISM.

124. FAY, EDW. ALLEN. Marriages of deaf-mutes in America. Volta Bureau, Washington, 1898.

125. LOVE, KERR J., and ADDISON, M. A demonstration on

the education of deaf-mutes. Address to the Glasgow Medical Society, Jan. 18, 1899. *Glasgow Med. Jour.*, April, 1899.

124. The work of FAY, 527 pages, contains most accurate statistics, from which the following conclusions are drawn : Marriages between deaf-mutes are more frequent in America than in Europe ; 23.1 % of former pupils of American deaf-mute schools are married, in Europe 7-12 % only, in Denmark as much as 23 %.

Marriages of deaf-mutes have steadily increased in the present century.

Marriages between deaf-mutes on both sides are more numerous than between deaf-mutes and non-deaf-mutes.

Marriages of congenital deaf-mutes give birth to more deaf-mute children than marriages of persons with acquired deaf-mutism, 12 % ; 4.2 %.

The number of deaf-mute children is increased if the deaf-mute parents are relatives, especially if, besides themselves, there are other deaf-mutes in the families

125. At a meeting of the Glasgow Medical Society, held on January 18th, KERR LOVE stated that there was no special physiognomy to mark deaf-mutes, except that, in 75 %, appearances characteristic of post-nasal growths were present. He had made comparative measurements of the chest, height, etc., and found that, with one notable exception, the deaf-mute had as good a physical development as his hearing fellow. The exception was, that the cranial circumference of the deaf-mute measured on an average half an inch less than the other, this being due to the fact that the cranial development which accompanied education of the hearing child, from two to seven years, was imperfect in the deaf-mute. Attention was drawn to the fact that some are not absolutely deaf. Islands of hearing may exist, but these islands are limited to sounds too high in pitch to permit of their use for teaching purposes. One case shown was discovered to have forty-one deaf-mute relatives.

The important question, whether marriage between deaf-mutes should not be interfered with, was raised.

Mr. ADDISON demonstrated in a number of pupils his method, adopted in the Langside school for deaf-mutes.

ARTHUR CHEATLE.

EXTERNAL EAR.

126. WASSMUND, D. (Berlin). Ossification of auricle and Roentgenography. *Deutsche med. Woch.*, 1899, No. 27.

127. MÖLLER, JÖRGEN. On perichondritis serosa auriculæ. *Hospitalstidende*, 1899, No. 8.

128. EPHRAIM, A. (Breslau). Cyst of ear canal. *Mon. f. Ohr.*, 1899, No. 5.

129. SUGÁR, M. Tumor of the auricle. *Arch. f. Otol.*, Bd. xlv, S. 94.

130. BLAKE, C. J. Relâchement du segment postero'-supérieur de la membrane du tympan. *Ann. des mal. de l'oreille*, etc., 1899, No. 5.

131. WASSMUND. On cicatricial closure of dry, persistent perforations of the drumhead by cauterization with trichloracetic acid (O'Kuneff's method). *Deutsche med. Woch.*, 1899, Heft 7.

132. PELTESOHN. On a new simple method to close persistent perforations of the drumhead. *Berl. klin. Woch.*, 1889, No. 16.

126. The ossification of which WASSMUND writes was caused by intense congelation of the right auricle. Inflammation, with formation of vesicles, with subsequent induration and disfiguring swelling, were the consequences. A Roentgen picture of the ossified auricle is appended.

HARTMANN.

127. JÖRGEN MÖLLER criticises the statement of Hartmann, that what is usually described as hematoma auris is mostly a formation of serous cysts. He reports three cases, the nature of which was not that of hematoma, but of perichondritis serosa, with only moderate symptoms of inflammation. The serous liquid may come from the fractured cartilage or from the irritated perichondrium. Treatment: Splitting of the cysts in their whole extent and plugging of the cavity with iodoform gauze.

HARTMANN.

128. In EPHRAIM's case the cyst was at the lower meatal wall, contained serous liquid, and extended to the angle of the lower jaw. The extirpation, through an incision parallel to the ascending process of the lower jaw, was followed by facial paralysis which three weeks later began slowly to disappear.

129. SUGÁR totally removed a melanosarcoma with giant cells. When, some time later, the patient died of phthisis, no metastases were found.

130. In chronic tuberculosis (according to BLAKE) the posterior upper quadrant of the drum membrane is greatly stretched, impairing hearing by diminution of surface and resistance to sound waves. Temporary improvement may be brought about by inflation of the drum, but permanent improvement requires other treatment. He recommends a strip of rubber 2 mm × 3 mm, in size, to be introduced, folded, with forceps into the ear canal and released when in contact with the drum membrane, where it will apply itself to the anterior and posterior walls of the canal. Little pieces of newspaper, introduced wet, or pencilling with collodium may also be of service. ZIMMERMANN.

131. WASSMUND has tried Okuneff's procedure in 22 cases (16 acute, 6 chronic middle-ear suppurations). In 25 a cicatricial closure of the perforation was obtained in relatively short time. HARTMANN.

132. PELTESOHN's communication is intended to popularize Okuneff's procedure. He has 7 cases of his own, children from three to twelve years; in 5 complete cicatrization had been obtained; in 2, who are still under treatment, the diminution of the perforation was distinct. MÜLLER (Stuttgart).

MIDDLE EAR.

a.—ACUTE SUPPURATION.

133. POOLEY, J. R. Two mastoid operations with unusual symptoms. *The Laryngoscope*, April 1, 1899.

134. BLOCH, LEO (Ekaterinoslaw). A case of empyema antri mastoidis. *Mon. f. Ohr.*, No. 4, 1899.

135. LERMOYEZ. Mastoïdite de Bezold chez un nouveau-né. *Ann. des mal. d'oreille*, etc., 5, 1899.

136. HASSLAUER, W. Acute mastoid periostitis in chronic dry middle-ear catarrh. *Mon. f. Ohr.*, No. 6, 1899.

137. WEISSMANN. Des mastoïdites aiguës s'ouvrant dans le conduit. *Arch. internat. de laryng.*, etc., xii., 3.

133. POOLEY reports two cases—one of a child of nine—in whom it was necessary to open the mastoid cells. In this case the patient had severe vomiting which continued for forty-eight hours after the operation. The vomiting was projectile in character and suggested a cerebral complication. The child recovered, however, without further operation.

In the second case, the patient, a man thirty-seven years of age, had acute otitis media, followed by mastoid disease. He suffered severe pain, and during his convalescence developed acute empyema of the frontal sinus. Pooley reports these cases to point out the fact "that there may be other reasons for the symptoms of vomiting and localized pain happening during the healing of a mastoid operation than an extension to the brain or involvement of the sinus, although we must constantly have these in mind."

GORHAM BACON.

134. In BLOCH's case there were no local symptoms, but vertigo and vomiting were present. Recovery. KILLIAN.

135. LERMOYEZ found in a child of two and a half months, which had suffered from acute coryza and otorrhœa three weeks previously, during the operation an abscess under the sternocleido-mastoid muscle owing to a perforation of the medial wall of the mastoid process. The mastoid was prematurely developed and contained a sequestrum the size of a pea.

ZIMMERMANN.

136. The periostitis of the mastoid in HASSLAUER's case was doubtless caused by an infection from outside. To suppose a middle-ear sclerosis as the cause of an acute purulent periostitis is not compatible with our present nosology. Unfortunately no bacteriological examination was made.

137. WEISSMANN, based on five cases of his own, to be published later, discusses the pathogenesis of the suppurations of the mastoid through the wall of the external ear canal. In his opinion they occur only if the air cells adjacent to the meatus (cellules limitrophes) are inordinately developed at the expense of the other cells, and secluded from the centre by intumescence of the mucous membrane. The point of perforation is formed at different places of the posterior meatal wall, at times even in its cartilaginous part, so that an external subperiosteal abscess may liberate itself into the external ear canal.

ZIMMERMANN.

b.—CHRONIC MIDDLE-EAR SUPPURATION.

138. FORNS. Contribution à l'étude de la pathologie de l'oreille moyenne. *Annales des mal. de l'oreille*, etc., 1899, 4.

139. FERRERI, G. Critique sur l'état de la chirurgie intratympanique dans les suppurations chroniques et les scléroses de l'oreille moyenne. *Ann. des mal. de l'oreille*, etc., 1899, 4.

140. FOUGERON. Des diverses modes d'ouverture spontanée à l'extérieur des abcès mastoïdiens ; observation d'un cas d'ouverture en avant dans le conduit auditif externe. *Ann. des mal. de l'or.*, etc., 1894, 4.

141. MÉNIÈRE E. Observation d'un cas de périostite chronique superficielle de l'apophyse mastoïde guérie par la pulvérisation d'ipsilène iodoformé. *Arch. internat. de lar.*, etc., xii., 2.

142. PLUDER, F. Psychische Störungen nach Warzenfortsatzoperationen. *Arch. f. Ohr.*, Bd. xlv., S. 101.

143. GLEASON, G. B. Chronic suppuration of the middle ear. *Journ. Am. Med. Assoc.*, June 10, 1899.

144. BOTEY. De la réunion précoce de l'incision rétro-auriculaire après les trépanations mastoïdo-attico-antrales. *Ann. des mal. de l'oreille*, etc., 1899, 5.

138. FORNS alleges to have also clinically observed the membranous partition wall which he has constantly found in the cadaver and which divides the drum into an anterior (tubar) and posterior (attico-antral) part (compare 3, *Zeitsch. f. O.*, xxxii., S. 185). From all the cases that have come under his care he selects three where in chronic suppuration and destruction of the lateral wall of the attic the partition wall was thickened, and neither liquid nor fluid that was introduced into the ear passed from one side to the other. Forns ascribes a good deal of importance, both physiologically and pathologically, to the existence of such a partition.

139. FERRERI, in his review of the current indications, for intratympanic operations, seems to emphasize two points in particular : (1) The ossicles are always secondarily affected in suppurations, and if extracted they frequently manifest spontaneous recoveries from previous destructive carious processes ; (2) in sclerosis the removal of the stapes, functionally, of very doubtful value.

ZIMMERMANN.

140. FOUGERON discusses the various places of perforation in mastoid suppurations and communicates one of those not quite so rare cases where chronic suppuration totally destroys the posterior upper meatal and the lateral attic walls : a spontaneous recovery analogous to the operative.

ZIMMERMANN.

141. MÉNIÈRE naïvely relates the following case: Acute otitis. Three weeks later swelling over the mastoid ; Ménière calls it chronic periostitis. Incision reveals a small carious patch

on the anterior lower part of the apex of the mastoid, which he scrapes and plugs without searching for a further morbid condition in the depth. Two weeks later pus is found deep in the ear canal and in the wound. The probe discovered bare bone. After different modes of treatment had been unsuccessful and another surgical interference was contemplated, Ménière chanced to read of ipsilen and by three pulverizations the suppuration was cured in two weeks.

ZIMMERMANN.

142. PLUDER relates two cases of psychosis owing to otchi-rurgical interference,—a rare occurrence.

CASE 1. Man of seventy-three years, in good circumstances; fond of alcohol, which does not well agree with him. An obstinate coryza probably made him more and more morose and brooding. He was complaining of headache and loss of memory. Acute otitis media with mastoiditis. Opening of the mastoid. Two days after the operation restlessness, delirium, apathy, ascites, icterus, death. No post-mortem. In this case the operation may have induced the psychosis, without being the cause of the fatal lesion. [A psychosis after an operation is rarely fatal. It seems not impossible that an acute cerebral abscess was present.—TRANSLATOR.]

CASE 2. Man of sixty-six years. Moderate alcoholism. Arterial sclerosis. Otherwise healthy. In 1896, mastoiditis. Opening, evacuation of deep-seated pus. A week later excited, weeping a great deal, somewhat apathetic. Sensibility of right hand somewhat reduced. Slight tendency to fall towards the left side when the eyes are closed. Symptoms increased. A deep abscess in the region of the operation had been opened. Extradural abscess. Gradually patient improved so much, that he could reassume his former occupation. "It is doubtful whether the extradural abscess was the cause of the mental derangement." A neurologist, who had been consulted, was inclined to assume a focus of softening in the internal capsule. [Circumscribed encephalo-meningitis cured by the liberation of the pus, in the opinion of the translator.]

143. GLEASON reports two cases operated on according to the method of Professor Passow. In each case there was a chronic otorrhœa, and cholesteatomatous material was removed.

GORHAM BACON.

144. BOTEY, contrary to recent methods of other authors, thinks that it is not good practice after radical operations not to

stitch the wound up immediately, nor to leave a persistent opening, but to tampon the wound, suture it on the eighth day, and insert a drainage tube, to be removed six days later.

ZIMMERMANN.

C.—CEREBRAL COMPLICATIONS OF MIDDLE-EAR SUPPURATION.

145. LUCAE, A. Operative cure of a case of purulent otitic meningitis. *Berl. klin. Woch.*, 1899, 23.

146. HAMMOND, L. J. Remarks on the diagnosis of cerebellar abscess in children. *Arch. of Pediatrics*, June, 1899.

147. McCONNACHIE, A. D., and HARTING, C. W. A case of cerebellar abscess. *Four. Am. Med. Assoc.*, April 8, 1899.

148. GREEN, J. ORNE. Cerebellar abscesses from infection through the labyrinth. *Am. Four. Med. Sciences*, April, 1899.

149. LEDERMANN, M. D. An unusual case of sinus thrombosis and epidural abscess, complicated with malaria; operation; recovery. *New York Med. Fourn.*, May 27, 1899.

150. BOTEY, R. Otite moyenne suppurée chronique avec carie attico-antrale, thrombophlébite du golfe de la veine jugulaire, propagée à la jugulaire interne jusqu'à son tiers inférieur; ligature de la jugulaire interne à la base du cou, suivie d'extirpation de ce vaisseau dans presque toute son étendue; trépanation de l'apophyse, de l'antré et de caisse. Guérison. *Ann. des mal. de l'oreille*, etc., 1899, 5.

145. LUCAE reports: Boy fourteen years, purulent discharge from right ear since his fourth year; for the last week pain behind the right ear, severe headache and beginning opisthotonus; temp. 30.0° C., pulse 105. At the immediate operation the dura mater over the roof of the antrum was found bare and gangrenous the size of a split pea; on introducing a probe a few drops of pus escaped. An incision into the substance of the brain liberated new pus. After the operation the symptoms persisted under the characteristic fluctuations of meningitis to disappear only after a copious discharge of pus through the opening in the dura.

On the thirteenth day after the operation the other ear, with a normal condition of the drumhead, became hard of hearing, supposed by Lucae to be due to hyperæmia of the labyrinth. He discusses the reasons for his supposition, and cites other analogous observations.

MÜLLER (Stuttgart).

146. HAMMOND has had five cases of cerebellar abscess, occurring in children during, the past four years, and believes that there is a line of symptoms which goes to determine beyond a doubt the presence of an abscess in the cerebellum. The symptoms are as follows: Rapid loss of flesh and strength; rapid pulse and high temperature for the first seventy-two hours, followed by a decline in temperature and an increase in the rapidity of the pulse; pronounced flexure of the extremities; progressive increase in the dilatation of the pupils, never, however, becoming fixed; half-unconscious condition with uncontrollable restlessness; a peculiar indisposition on the part of the patient to obey requests made; the presence of sugar in the urine; slow respiration; if standing, tendency to go toward one side; swinging of the hands, always toward one side, and entire absence of paralysis.

GORHAM BACON

147. The case reported was that of a boy, twelve years of age, who had chronic otorrhœa (right side) following typhoid fever. A year ago he had nausea, vomiting, and vertigo. There was a sudden arrest of the discharge from the ear followed by coma. The mastoid cells were opened, the outer cortex being very dense. Cholesteatomatous material was found and free communication established between the antrum and the external meatus. The boy did not improve, but remained irritable, with a pulse of 66. The temperature was normal, pupils slightly dilated and intolerant of light. Other symptoms developed, viz., yawning, semi-consciousness, and retraction of the head. The boy died. An abscess was found in the right cerebellar lobe at the autopsy.

GORHAM BACON.

148. In this paper, GREEN reports three cases of chronic suppuration of the tympanum, complicated by caries extending into the labyrinth, and abscess of the cerebellum. The cases terminated fatally. A fourth case was also reported, viz., a case of chronic suppuration of the tympanum with caries involving the labyrinth, but unattended with any brain lesion. This patient recovered. The patient sought advice because he had suddenly become very dizzy and experienced considerable pain in the left side of the head and ear. A few days later he had a slight chill. About a week later, the operation of opening the mastoid was performed when the bone was found densely sclerosed, the antrum and aditus being full of desquamative material. There was a carious opening on the posterior part of the inner wall of the

aditus. There was pain in the stomach and constant nausea. No pain in the head.

In the four cases, there was a chronic otorrhœa which ran the usual course until there was a sudden attack of vertigo, followed soon by a dull pain in the ear. In one there was a marked increase in the deafness. The vertigo was undoubtedly due to the implication of the semicircular canals. In all cases there was marked headache. In the three cerebellar abscess cases, it was bilateral; in two of these frontal, and in the other at the vertex. In the fourth case of simple caries, the headache was unilateral on the affected side. Paralysis of the abducens occurred in two, in one bilateral, in one unilateral, on the opposite side from the ear disease. Optic neuritis was present in only one case. In Case 3, the facial paralysis was due, probably, to pressure on the nerve in the Fallopian canal. Leucocytosis was present in two of the cases of cerebellar abscess. In the fourth case, nystagmus, on looking away from the diseased ear, was well marked. Sclerosis of the bone existed in all cases. In all four cases the semicircular canal had been perforated through caries at a point where it comes against the aditus wall. In the three fatal cases the wall of the vestibule just above the Fallopian canal had been destroyed; in two of them the entire tympanic horizontal portion of that canal had also been destroyed. The cerebellar abscesses were situated in the anterior and lower portions of the cerebellum on the same side as the ear disease. Abscesses of the cerebellum were due to extension of the inflammation through the inner wall of the mastoid, or through the labyrinthine passage.

GORHAM BACON.

149. The patient, a man twenty-nine years of age, came to the hospital suffering from an attack of earache (right side). The drum-head was incised but only bloody serum escaped. The mastoid region was painful and tender on pressure and somewhat swollen. It was necessary to make several incisions in the drum-head but at no time did any pus escape. The temperature was 104.2° F. There was a marked rise and fall in the temperature for the next five or six days. He then had a decided chill. At that time a microscopical examination of the blood demonstrated plasmodium malarie. Hypodermic injections of the muriate of quinine in five-grain doses were given. Internally Fowler's solution was also administered. Although there was a temporary improvement it became necessary to open the mastoid cells. The antrum was

found filled with granulation tissue and a drop or two of pus was discovered in the tip. The lateral sinus was filled with pus. The thrombus was removed and free bleeding established from both ends of the divided sinus. The patient recovered.

GORHAM BACON.

150. BOTEY's case is not complete despite the long title. The elaborate description of the very grave case shows that the last word "Guérison," should be supplemented by "Death from Pyopneumothorax." Botey thinks that the last affection is to be looked upon as an independent intercurrent disease, but we have to consider that at the operation the jugular was ligated and resected, yet the sigmoid sinus, the probable original seat of the disease, remained unopened, and additionally that a gangrenous cul-de-sac, which could not be opened to the bottom, was behind the sterno-clavicular articulation.

ZIMMERMANN.

d.—OTHER MIDDLE-EAR AFFECTIONS.

151. PONTIÈRE. Corps étrangers de la caisse du tympan. *Ann. des mal. de l'oreille*, etc., 1899, No. 4.

151. PONTIÈRE'S case. Otorrhœa 16 years. After the removal of a polypus there was found in the now well exposed drum cavity a curved piece of copper wire 12 mm long, resting on the promontory. The patient when a child, sixteen years ago, probably stuck it in his ear, and the physician, in endeavoring to get it out, forced it deeper in.

NERVOUS APPARATUS.

152. VEIT, Frankfurt-on-Main. Hysterical deaf-mutism. From the practice of Moritz Schmidt. *Münch. med. Wochenschr.*, 1899, No. 13.

152. VEIT reports that a man of twenty-six years woke up a deaf-mute six weeks before his presentation. In writing he could very well make himself understood. Anæsthetic regions and palsies were missing. The deafness was absolute. Attempts to speak were followed only by inarticulate sounds. After letting him read the sentence, written by the physician before him: "You will hear again in a few minutes"! he was catheterized with a good deal of difficulty, but hearing and speech returned at once.

SCHEIBE.

NOSE AND NASO-PHARYNX.

a.—GENERAL PATHOLOGY.

153. KIDD, PERCY, and MCBRIDE, P. Discussions on asthma in its relation to diseases of the upper air-passages. *Proceed. Laryngol. Soc. London.*

154. HAAG, Bern. On the shape of the facial skull. Etiology and treatment of congenital choanal atresia. *Arch. f. Laryng.*, ix.

153. KIDD and MCBRIDE opened a discussion on asthma and its relation to diseases of the upper air passages. It is impossible to give a detailed abstract of the various opinions given by members of the society. It could, however, be gathered that treatment applied to the upper air passages in this disease was not absolutely curative although sometimes of great value. The discussion is worth careful study.

ARTHUR CHEATLE.

154. The very elaborate paper by HAAG, written under the direction of Siebenmann, first details three new cases of congenital atresia of the choanæ with particular consideration of the dimensions of the skull incident to this malformation; then follow, in tabular arrangement, a review of all such cases published thus far, and finally remarks on the genesis of these malformations with their treatment according to Siebenmann. He draws the following conclusions: As in 26 per cent. of the cases, despite the congenital mouth-breathing, the palate was normal, the "high palate" should not be considered as the consequence of mouth-breathing alone; it shows itself here again as one of the symptoms of leptorhopy. Asymmetry of the face is not produced by the obstruction of one naris. In the so-called typical cases the obturating membrane is probably the persistent, bucco-nasal membrane (Hochstetter) moved backward in the course of its development. The author was surprised to find in two of his cases a diminutive bony framework of the lower turbinals, letting the calibre of the lower part of the nasal passages appear larger. In each of the three cases the treatment (perforation of the occluding membranes with the chisel, removal of the fragments with sharp spoons and sickle-knives, eventually resection of the posterior end of the septum) restored the sense of smell. Hearing always was normal.

ZARNIKO.

b.—METHODS OF EXAMINATION AND TREATMENT.

155. BERGEAT, HUGO (Münich). External rhinoscopy, recess of the tip of the nose. *Mon. f. Ohr.*, 1899, No. 4.

156. MÖLLER, JÖRGENS (Copenhagen). A new palate-hook. *Ibid.*, No. 6.

157. ALEXANDER, A. (Berlin). Protargol in rhino-laryngological practice. *Arch. f. Lar.*, ix.

158. SEILER, CARL. Epistaxis: its cause and treatment. *Med. Record*, May 27, 1899.

159. SCHEINKMANN, B. An instrument for use in epistaxis. *Med. Record*, May 27, 1899.

160. PETERS, W. H. A simple and perfect nasal tampon. *Four. Am. Med. Assoc.*, April 22, 1899.

161. WELLS, WALTER A. The value of thiol in nose and throat practice. *Philad. Med. Four.*, April 15, 1899.

155. BERGEAT says when we hold a heated laryngoscope under the external orifice of the nostril we can easily inspect the recessus apicis, a region the direct examination of which is connected with some difficulty.

KILLIAN.

156. The new palate-hook (MÖLLER's) is made of German-silver wire and curved in such a way as to hold it together with Türck's tongue depressor in the same hand.

KILLIAN.

157. ALEXANDER brushes protargol in a 1-per-cent. solution in pharyngo-laryngitis, massages the mucous membrane with a 5-per-cent. solution in hay-fever, and injects the same solution, after syringing, in simple, uncomplicated empyema of Highmore's antrum—all of which with very satisfactory results. Without effect is protargol in angina, pharyngo-mycosis benigna, diphtheria, tuberculous or non-tuberculous ulcerations.

ZARNIKO.

158. The causes of epistaxis are: *a*, acute traumatic; *b*, chronic traumatic, due to infliction of slight lesions upon the mucous membrane at frequent intervals; *c*, general symptomatic, from general systemic disorders, as typhoid fever, malaria, sun-stroke, and hemophilia; and *d*, local symptomatic ones from the nasal mucous membrane and cavernous tissue, induced by sneezing, excitement, mucous polypi, etc.

For the treatment it is important to obtain a good view of the nasal cavity, which is accomplished by cocainization. In spontaneous epistaxis from ulcerations thorough curetting is advisable, the surface then being covered with spunk. Cotton or lint or any other fibrous material should never be used, owing to the close adherence of the fibres. Iron is also to be avoided.

M. TOEPLITZ.

159. SHEINKMANN's instrument consists of two oblong, sausage-like rubber air chambers, united and communicating with each other by a constricted neck. The distal or nasal portion contains a blunt-pointed rod, the outer extra-nasal chamber is filled with air and retains its shape, while the nasal is collapsed. The proximal extremity of the former is provided with a spool upon which the chamber is wound up in the process of emptying its air contents into the nasal chamber, and a catcher, which keeps it from unwinding itself.

M. TOEPLITZ.

160. Three rubber condoms are cut off by PETERS to a length of $3\frac{1}{2}$ inches. A No. 9 soft rubber catheter, with a few extra holes snipped within two inches from the tip, is inserted with two inches of its tip into one condom the upper half-inch of which is tied with thread upon the catheter without obstructing its lumen. A second condom is slipped over the first, expelling all air between the two, and the upper half-inch is wrapped closely down upon the similar wrapping below it. The third condom is then applied in the same manner. This three-ply soft tampon is easily introduced when wet into the nose and inflated by the mouth. The projecting end of the catheter is bent upon itself and wrapped with a thread.

M. TOEPLITZ.

161. WELLS has seen good results from the use of thiol, an odorless artificial ichthyol, in attacks of acute laryngitis, applied as spray (2%), and in acute rhinitis as ointment (5:30) or insufflation (5:20). Subjective symptoms promptly subside. In chronic inflammations, particularly with œdematous and boggy mucous membrane, and in acute and chronic cases of gouty or rheumatic character thiol is most useful. Atrophic rhinitis is thereby not benefited.

M. TOEPLITZ.

c.—OZÆNA.

162. HAMM (Braunschweig). The treatment of ozæna by citric acid. *Münch. med. Woch.*, 1899, No. 15.

162. After cleansing the nose HAMM insufflates citric acid with sacch. alb. in equal parts 3 times daily. The fœtor temporarily disappears. Under permanent treatment in this way the secretion also diminishes.

SCHEIBE.

d.—NEW-FORMATIONS IN THE NOSE.

163. BREITUNG, MAX (Coburg). Dangerously grave collapse after the operation for nasal polypi. *Wien. klin. Woch.*, 1899, No. 22.

163. After operating on nasal polypi for half an hour one of BREITUNG's patients had a great collapse which was overcome by artificial respiration.

c.—DISEASES OF THE ACCESSORY CAVITIES.

164. WELTERT, JOS. (Neuenkirch). 23 cases of antrum empyema with consecutive orbital phlegmon. *Inaug. Dissertation*, Basel, 1899.

165. FEIN (Vienna). A powder blower for Highmore's antrum and the dry treatment of empyema with powdered nitrate of silver. *Arch. f. Lar.*, ix.

166. LUC (Paris). Contribution à l'étude de la mucocèle du sinus frontal. *Ann. des mal. de l'oreille*, etc., 1899, No. 4.

167. LUBET-BARBON et FURET (Paris). Contribution à l'étude des sinusites fronto-maxillaires. *Ibid.*, No. 6.

168. DOWNIE, WALTER. Frontal sinusitis with several illustrative cases. Address at the Glasgow Med. Soc., March 4, 1899. *Glasgow Med. Journ.*, May, 1899.

169. KARUTZ (Lübeck). Frontal sinus empyema after galvanocautery. *Arch. f. Lar.*, viii.

170. CORDES, H. (Berlin). On the treatment of affection of the frontal sinuses. *Mon. f. Ohr.*, 1899, No. 5.

164. WELTERT gives quite a complete picture of orbital cellulitis (phlegmon) from antral empyema. He found 21 cases recorded in literature, and adds two others, which were observed in the Basel Eye Hospital and rhinologically treated by Tchevandt. The orbital phlegmon is brought about by osteo-periostitic processes. The cerebral complications are mostly brain abscess with meningitis; in empyema of the sphenoid there are sinus-thrombosis, never abscess. Even in desperate cases treatment may afford improvement and recovery. HARTMANN.

165. The little instrument of FEIN admits of blowing powder from a hole in the alveolus evenly over the mucous membrane of the maxillary antrum. In two cases (!—Reviewer) of obstinate antral suppuration improvement (!—Reviewer) followed by methodical insufflation of pure nitrate of silver. The author expresses his gratitude to his highly esteemed chief, Prof. Chiari, for the permission to make these experiments in his wards.

ZARNIKO.

166. LUC's case, a woman of thirty-four, had a hard swelling

at the upper inner corner of the orbit. The operation revealed an ectasia of the frontal sinus not only into the orbit, but also backward under the dura mater, containing opalescent, ropy liquid. The fronto-nasal duct was occluded by osteosclerosis. Complete recovery [How long?—Translator]. ZIMMERMANN.

167. LUBET-BARBON and FURET's elaborate paper is based on 39 cases of suppuration of the accessory sinuses, observed during the last five years, whose histories are dispersed through the text. It contains so many, if not new, yet so well-reported details that the reading of the original is heartily recommended.

ZIMMERMANN.

168. DOWNIE's paper was read at a meeting of the Glasgow Medico-Chirurgical Society held on March 3, 1899. He found that the anterior ethmoidal cells were the seat of suppurative process in five out of six cases of latent empyema of the frontal sinus; and believes that the trouble originates in the ethmoidal cells. With regard to treatment he deprecates bougieing, catheterizing, or tapping through the nose as being futile and fraught with danger. He first removes the anterior third or more of the middle turbinal under cocaine by means of the electric cautery or cold snare; in some portions thus removed he demonstrated that one cell had developed or become distended at the expense of neighboring cells to form the walls of a large bony cyst. The fronto-ethmoidal cells are then, or subsequently, broken down by means of a small curette; thus removing one possible source of obstruction from the frontal sinus. When this is healed, he opens the sinuses by means of a mid-line incision, if there is a probability of both being affected; if on the other hand one alone is affected, the incision is made along the superciliary ridge. The greater part of the anterior wall should be removed to facilitate satisfactory examination and thorough clearing. He does not use a drainage tube into the nose but packs the cavity firmly with double cyanide gauze, the end of the packing being brought out through a counter-opening made close to the inner canthus. The incision is closed throughout, the packing being left in for from 7 to 14 days. Five interesting cases are related.

ARTHUR CHEATLE.

169. KARUTZ's case is as follows: A week after galvano-caustic treatment of the lower turbinal of a thirty-year-old working-man: intense pain in the right upper naso-orbital corner and the supra-orbital region, heaviness of head, vertigo, chilliness, general

weakness, great swelling of the nose; two days later, with increased pain, œdema of the cheek, the skin of the forehead, root of the nose, and the eyelids. In the middle nasal passage a great deal of pus, the origin of which on probing was found to be in the frontal sinus. Under antiphlogistic treatment and good drainage, recovery in two weeks. The author advises restriction of galvanocaustic interferences.

170. CORDES recommends a double chisel to remove parts of the anterior wall of the sphenoidal sinus. With an elevatory the middle turbinal can be pushed sideways and infracted to make the sphenoidal cavity accessible. If necessary the middle turbinated may be removed. The author does not seem to know the reviewer's article on rhinoscopia posterior in the *Munch. med. Woch.*, 1896, No. 33.

KILLIAN.

f.—SEPTUM.

171. BOSWORTH, F. H. Treatment of nasal stenosis due to deflective septa with or without thickening of the convex side. *Laryngoscope*, June, 1899.

172. WATSON, ARTHUR W. Treatment of nasal stenosis due to deflective septa, with or without thickening of the convex side. *Ibid.*, June, 1899.

173. ASCH, MORRIS J. Treatment of nasal stenosis due to deflective septa, with or without thickening of the convex side. *Ibid.*, June, 1899.

174. DOUGLASS, BEAMAN. Treatment of nasal stenosis due to deflective septa, with or without thickening of the convex side. *Ibid.*, June, 1899.

175. ROE, JOHN O. Treatment of nasal stenosis due to deflective septa, with or without thickening of the convex side. *Ibid.*, June, 1899.

176. GLEASON, E. B. Treatment of nasal stenosis due to deflective septa, with or without thickening of the convex side. *Ibid.*, June, 1899.

171. BOSWORTH still advocates the use of the saw, with which he saws a new septum out of the old and crumpled one, in the same manner as a straight board is sawed out of a crooked log. The advantage of the operation consists in the fact that it can be performed at an office sitting, and it restores the normal respiratory function of the nose.

M. TOEPLITZ.

172. WATSON, after thorough cocaineization, makes an incision through the septum from the convex side from far behind and well forward, the cut from below upward forming a bevel, and, if a perpendicular and anterior angle is present, another incision from above downward, also bevelled, is added, meeting the first below. The thickened angle is removed in form of a wedge. The whole septum is then pushed over with the finger, whereby the lower edge of the upper fragment is made to jump over the lower fragment. The bony septum, if deflected, is broken by Adams's forceps. The redundant projecting lower fragment is removed with the saw. The incisions are made with a stout, pointed tenotome. He uses gauze pads or Roberts's pin to hold the fragments in position.

M. TOEPLITZ.

173. The principle of the operation originally devised by ASCH does not consist in cutting away the deviated portion, nor in making a perforation, but in destroying the resiliency of the cartilage, so as to straighten it and re-establish the respiratory function. From October, 1898, to April, 1899, 139 cases were operated, in addition to the 200 cases reported by Dr. Emil Mayer, without producing any complications, sepsis, hemorrhage, or perforation. The method of operation is very minutely described. The operation is performed in deviations of the cartilaginous septum only.

M. TOEPLITZ.

174. DOUGLASS, after preliminary removal of exostoses and ecchondroses and of pathological conditions of the turbinated tissues from the unobstructed side, perforates the septum along the lines of deflection in all directions at the greatest convexity. He used first a spear-knife and then a blunt-pointed bistoury. In deflections at the floor of the nose with implications of both the bony ridge and cartilage, the bone is broken from its attachment with the forceps. If the cartilage has slipped from its articulation at the floor, the knife is drawn all along this deflection. Adhesions are broken with a periosteal elevator, the fragment of the septum bent back with the finger, and splints introduced.

M. TOEPLITZ.

175. The deflection of the cartilaginous septum is almost invariably associated with deflections of the anterior osseous portion of the septum; the posterior portion is but rarely deflected. In order to straighten the septum, the direction of the anterior osseous portion is to be changed. This is best done with ROE's fenestrated comminuting forceps, with one blade made

in the form of a ring, the other fitting into it, which breaks the osseo-cartilaginous portion by slightly rotating the blades. The cartilage is cut through by two incisions crossing each other, to which lower and superior horizontal subcutaneous incisions are added, and the septum then placed in position by a flat-bladed forceps. Roe uses an antiseptic-cotton dressing.

M. TOEPLITZ.

176. GLEASON makes a U-shaped incision entirely around the deviated area with the saw and pushes the tongue-shaped flap with the finger tip through the hole in the septum. The deviated area then becomes a hanging trap-door with a spring hinge. The operation is best adapted for vertical deviations, owing to the narrowness of the flap. In horizontal deviations, owing to the greater resiliency, the flap has, in twenty per cent. of the cases, pushed back again; these cases are supported by tubes.

M. TOEPLITZ.

g.—OTHER DISEASES OF THE NOSE.

177. FALKINER, N. A peculiar clot in a case of epistaxis. *Lancet*, April 22, 1899.

178. MEYER, F. (Darmstadt). Contribution to the genesis of rhinoliths. *Arch. f. Laryngol.*, ix. (Nothing remarkable.)

179. GAREL, J. Le rhume des foins. (Actualités médicales). 96 pages. Paris, 1899.

180. GOERKE, M. (Breslau). Pathology and diagnosis of tuberculoma of the nose. *Arch. f. Laryngol.*, ix.

181. DONOGÁNY, Z. (Budapest). Contributions to the histology of the nasal septum, with particular consideration of habitual nose-bleed. *Arch. f. Laryngol.*, ix.

177. At a meeting of the Royal Academy of Medicine in Ireland, March 24, 1899, FALKINER narrated the case of a woman, aged seventy-six, who, during the course of severe epistaxis which caused her death, coughed up a blood-clot forming a cast of the posterior nares with a process about eight inches in length, which probably extended down into the œsophagus.

ARTHUR CHEATLE.

179. Based on 68 cases of hay-fever and 91 of unperiodical vaso-motory coryza, GAREL discusses practically and extensively the history, etiology, symptoms, diagnosis, prognosis, and treatment of the two affections, and arrives at the following conclusions: Hay-fever is only a variety of vaso-motory rhino-bronchitis.

The latter occurs unperiodically and, as hay-fever, periodically. Both are distinguished by their cause. The occurrence of hay-fever depends on (1) predisposition, (2) hyperæsthesia of the nasal mucous membrane, (3) an external exciting agency (pollen, for instance). The treatment must take these three factors into account. The hyperæsthesia of the nasal mucous membrane is amenable to surgical treatment only (galvano-cautery).

BRÜHL.

180. GOERKE found at the histological examination of a tuberculous tumor in and near giant cells numerous round and curved formations, staining with logwood intensely blue or violet, which at first excited suspicions of the so-called foreign-body tuberculosis. The deepest layers contained, however, tubercle bacilli, revealing the real nature of the tumor. Microchemically and tinctorially chalk, Unna's elæin, and iron-pigment were found. Probably they were degenerated vessels. The author recommends caution in the interpretation of the microscopic conditions of formations simulating foreign-body tuberculosis.

ZARNIKO.

181. DONOGÁNY gives the results of his investigations of 100 pieces of the pars cartilaginea of the nasal septum, made under Hausemann's guidance, as follows: (1) The hemorrhages of the cartilaginous septum are caused mostly by local alterations. (2) These alterations are either of pathological or embryonal origin. In the former case dilatation of the vessels; in the latter a kind of cavernous tissue is present. (3) Besides these changes, the sub-epithelial connective tissue plays an important part, rendering hemorrhage more difficult by its abundance, easier by its atrophy or absence.

ZARNIKO.

h.—NASO-PHARYNGEAL CAVITY.

182. PIFFL, OTTO (Prague). Hyperplasia and tuberculosis of the pharyngeal tonsil. *Zeitsch. f. Heilk.*, xx., 1899.

183. BARTH, EUGENE. On the technique of the operation of adenoid vegetations of the naso-pharyngeal cavity and the peritonsillar abscesses of the faucial tonsils. *Deutsch. med. Woch.*, 1899, No. 14.

184. KANTOROWICZ (Rostow-on-Don, Russia). On the diagnosis of the adenoid proliferations. *Arch. f. Lar.*, viii.

185. PATERSON, D. K. Foreign body impacted in the naso-pharynx for four years. *Proc. Lar. Soc.*, London, March, 1899.

186. WARNECKE (Berlin). Pseudo-membranous rhinitis with formation of a fibrinous tumor in the naso-pharynx. *Arch. f. Lar.*, viii.

182. PIFFL examined 100 cases of hyperplastic pharyngeal tonsils, mostly from Zaufall's clinique. In only three cases tuberculosis was surely ascertained by histological examination. All cases were clinically examined, also with regard to hereditary disposition. These investigations brought out nothing that could support the hypothesis of a tuberculous origin of the hyperplasia. Piffel advises, in cases of the least suspicion of tuberculosis, to remove the pharyngeal tonsil at once, and radically, in particular if swollen lymphatic glands are on the neck. HARTMANN.

183. BARTH removes pieces of adenoid vegetations that have been left behind, with Hartmann's conchotom. He opens peritonsillar abscesses with a pair of somewhat pointed forceps, after having first punctured and superficially incised the abscess.

NOLTENIUS.

184. KANTOROWICZ introduces a charged cotton-holder (Heryng's) high up into the pharynx and withdraws it in a few seconds. If it is stained with blood, the presence of adenoids is probable. In sufficiently wide nasal passages he introduces a probe, armed with cotton wool, as far as to touch the posterior pharyngeal wall. If blood is found on it, adenoids are probably there.

ZARNIKO.

185. A child aged six years was brought to PATERSON with discharge from the left ear, fætid discharge from the left nostril, and nasal obstruction. Something could be seen in the posterior nares on looking through the left nostril. Under an anæsthetic a metal regulator for rubber tubing, thickly coated with phosphates, was removed. When the child was fifteen months old, while playing with the regulator, it suddenly showed difficulty of breathing; nasal obstruction had been present since that time.

ARTHUR CHEATLE.

186. WARNECKE's case refers to a woman, thirty-one years of age, who had a polypus removed from the right nostril, October, 1896. In 1897 she presented herself again at the Berlin University Ear Clinique with occlusion of the nose. Warnecke extracted, besides several hyperplastic new formations of the middle turbinal, a pedunculated tumor the size of a large cherry, hanging down from the middle turbinal into the naso-pharynx. It consisted purely of fibrine and contained streptococci and staphylococcus aureus.

ZARNIKO.

SOFT PALATE, PHARYNGEAL AND BUCCAL CAVITIES.

187. KRONENBERG, E. (Solingen). Angina and acute muscular rheumatism. *Munch. med. Woch.*, 1899, No. 27.

188. HENDELSON (Breslau). Reaction of the tonsillar tissue upon aspersion of pulverized substances. *Arch. f. Lar.*, viii.

189. CHEATLE, ARTHUR H. Polypoid growth springing from the right supra-tonsillar fossa. *Proc. Laryng. Soc.*, London, April, 1899.

190. CHEATLE, ARTHUR H. Large puma in posterior pharyngeal wall. *Proc. Laryng. Soc.*, London, March, 1899.

191. LACH, LAMBERT. Case of miliary tuberculosis of fauces, etc. *Proc. Laryng. Soc.*, London, April, 1898.

192. AVELLIS (Frankfort-on-Main). Lipoma of the tonsil. *Arch. f. Lar.*, viii.

187. KRONENBERG's patient had papillomatous proliferations of the nose removed with the cold snare. Six days later severe articular rheumatism set in which ended in death. Kronenberg considers the operation as the cause, though the course of healing was normal. Four weeks previously proliferations had been removed on the other side, followed by angina in three days.

SCHEIBE.

188. After an extensive review of the incident literature, HENDELSON communicates the experiments which he made under the auspices of R. Kayser. Even a short time after the inflation numerous finest coal particles were found in the interior of the tonsillar tissue, underneath the epithelium. The longer the time after the blowing of the powder on the tonsil, the deeper in the tissue the particles are found, whereas they become scarcer in the superficial layers. The dust particles are situated partly in the cells, partly in the interstices. If an emulsion of foreign substances (soot, cinnabar) is injected into the tonsils, a transportation of the granules by the emigrating leucocytes towards the surface is noticed, which, however, seems insufficient to be a protective action. Practical conclusions: The tonsils not being protective organs, on the contrary, receptacles of infective germs, their removal, if they are enlarged, is indicated, not only in the interest of easy respiration and deglutition, but to obviate infective diseases.

ZARNIKO.

189. A female, aged twenty, had for a month complained of

discomfort on swallowing. On examination, both tonsils were somewhat hypertrophied, and springing from the right supra-tonsillar fossa was a smooth pale mass about an inch and a half in length, hanging over the tonsil on that side. Sections showed the mass to be covered with squamous epithelium, lymphoid masses being scattered about among connective tissue in its interior.

ARTHUR CHEATLE.

190. A married woman, aged thirty-seven, came complaining of difficulty in swallowing, and a "lump" in her throat. A smooth, pink swelling, an inch and a half in breadth, situated slightly to the left of the middle line, reached from high up in the naso-pharynx downwards to the level of the top of the larynx. It was soft and fluctuating in the centre, firm at the edges, where it faded into the surrounding parts. There was a history of numerous miscarriages and some still-births. Resolution was taking place under iodide of potassium and perchloride of mercury.

ARTHUR CHEATLE.

191. LACH's patient was a female aged twenty-six, who was very anæmic and wasted in appearance, and who had suffered from a cough for about two years, with wasting for six months and a sore throat for six weeks. The mucous membrane of the fauces and adjacent part of tongue and pharynx on the left side was reddened and slightly swollen. The surface being covered with minute, superficial, clearly defined ulcers, with ashy-gray, sloughy bases. At the periphery of the affected part the ulcers were distinct, in the centre partly confluent. The upper part of the larynx, the epiglottis, ary-epiglottic folds, and arytenoids were greatly swollen and covered with superficial worm-eaten ulceration. The cords were normal. Active phthisis at both apices, with cavitation at the right.

ARTHUR CHEATLE.

192. AVELLIS's very rare case of a lipoma of the tonsils is briefly described and illustrated by two drawings.

MISCELLANEOUS NOTES.

THE OTOLOGICAL SOCIETY OF THE UNITED KINGDOM.

A society with the above title is being formed in London, the following gentlemen forming the Initiating Committee. It will be seen that the society is started under the best auspices.

E. CRESSWELL BABER, Brighton.	A. BROWN KELLY, Glasgow.
J. B. BALL, London.	RICHARD LAKE, London.
C. A. BALLANCE, London.	EDWARD LAW, London.
H. A. BALLANCE, Norwich.	L. A. LAWRENCE, London.
BARCLAY BARON, Clifton.	C. J. LEWIS, Birmingham.
THOMAS BARR, Glasgow.	P. MCBRIDE, Edinburgh.
F. W. BENNETT, Leicester.	PROFESSOR MACEWEN, Glasgow.
A. H. BENSON, Dublin.	F. MATHESON, London.
J. W. BOND, Dublin.	W. MILLIGAN, Manchester.
ADOLPH BRONNER, Bradford.	STEPHEN PAGET, London.
J. WALTON BROWNE, Belfast.	H. PEGLER, London.
W. C. BULL, London.	BILTON POLLARD, London.
ARTHUR H. CHEATLE, London,	URBAN PRITCHARD, London.
Prov. Hon. Sec.	W. LAIDLAW PURVES, London.
A. E. CUMBERBATCH, London.	A. W. SANDFORD, Cork.
SIR WILLIAM DALBY, London.	J. M. E. SCATLIFF, Brighton.
GEORGE FIELD, London.	MARMADUKE SHIELD, London.
DUNDAS GRANT, London.	SCANES SPICER, London.
G. T. GUILD, Dundee.	W. H. R. STEWART, London.
F. G. HARVEY, London.	GEORGE STONE, Liverpool.
W. HILL, London.	J. B. STORY, Dublin.
W. JOBSON HORNE, London.	ST. CLAIR THOMSON, London.
VICTOR HORSLEY, London.	HERBERT TILLEY, London.
T. MARK HOVELL, London.	LOGAN TURNER, Edinburgh.
J. M. HUNT, Liverpool.	E. WAGGETT, London.
PERCY JAKINS, London.	H. SECKER WALKER, Leeds.
MACKENZIE JOHNSTON, Edinburgh.	P. WATSON WILLIAMS, Bristol.
HUGH E. JONES, Liverpool.	R. H. WOODS, Dublin.
MACNAUGHTON JONES, London.	P. MCLEOD YEARSLEY, London.

APPOINTMENTS.

ARTHUR H. CHEATLE, F.R.C.S., has been appointed Assistant Aural Surgeon to King's College Hospital, London.

J. P. W. GAY, F.R.C.S., Honorary Surgeon to the Nottingham and Notts. Hospital for Diseases of the Throat, Ear, and Nose.

R. W. HERRICK, M.D., has been reappointed Honorary Surgeon to the Nottingham and Notts. Hospital for Diseases of the Throat, Ear, and Nose.

JOBSON HORNE, M.D., M.R.C.P., Physician to the Metropolitan Throat and Ear Hospital, London.

HUGH E. JONES, M.R.C.S., L.R.C.P., Honorary Surgeon to the Liverpool Eye and Ear Infirmary.

RICHARD LAKE, F.R.C.S., Surgeon to the Metropolitan Throat and Ear Hospital, London.

W. MILLIGAN, M.D., Honorary Aural Surgeon to the Royal Infirmary, Manchester.

DONALD STEWART, M.D., Glasgow, reappointed Honorary Consulting Surgeon to the Nottingham Throat, Ear, and Nose Hospital.

H. SECKER WALKER, F.R.C.S., Surgeon to the Ear and Eye Department of the Leeds Infirmary, vice H. Bendelack Hewetson, M.R.C.S., deceased.

Obituary.

THE LATE MR. BENDELACK HEWETSON

Mr. BENDELACK HEWETSON, Honorary Ophthalmic and Aural Surgeon to the Leeds General Infirmary, died on May 15th at the age of forty-nine. For some years past Mr. Hewetson's health had been a cause of anxiety to his friends, but symptoms of chronic renal disease only became threatening during the early months of this year.

Born in 1850, Mr. Hewetson was educated at the Leeds Grammar School and the Leeds School of Medicine, and after qualifying studied for some time at Moorfields and Guy's. In 1883 he was appointed Surgeon at the Leeds Dispensary, but resigned a few months later on being elected Honorary Surgeon in the

Eye and Ear Department of the General Infirmary, an appointment he continued to hold until his death.

In 1893 Mr. Hewetson was President of the Otological Section of the British Medical Association at their annual meeting in Newcastle, and in his opening address strongly advocated compulsory instruction in aural diseases in the ordinary medical curriculum.

At one time or another Mr. Hewetson was Ophthalmic and Aural Surgeon to the Yorkshire Institution for the Deaf and Dumb, Surgeon to the Reynaud Hospital, Willingham, and President of the Leeds Naturalists' Club.

SEVENTH INTERNATIONAL OTOLOGICAL CONGRESS.

Owing to the date for holding the International Medical Congress falling in 1903, it has been decided that the next International Otological Congress shall not take place in that year, but in 1902. The meeting will be held at Bordeaux, under the presidency of Dr. Moure.

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